Access DB# _____

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: _____ Examiner # : _____ Date: _____
Art Unit: _____ Phone Number 30 _____ Serial Number: _____
Mail Box and Bldg/Room Location: _____ Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc. if known. Please attach a copy of the cover sheet, pertinent claims, and abstract

Title of Invention: _____

Inventors (please provide full names): _____

Earliest Priority Filing Date: _____

For Sequence Searches Only *Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

Dec. 16, 1998

****

STAFF USE ONLY	Type of Search	Vendors and cost where applicable
Searcher: _____	NA Sequence (#)_____	STN _____
Searcher Phone #: _____	AA Sequence (#)_____	Dialog _____
Searcher Location: _____	Structure (#) _____	Questel/Orbit _____
Date Searcher Picked Up: _____	Bibliographic _____	Dr.Link _____
Date Completed: 5/19/03	Litigation _____	Lexis/Nexis _____
Searcher Prep & Review Time: 20	Fulltext _____	Sequence Systems _____
Clerical Prep Time: _____	Patent Family _____	WWW/Internet _____
Online Time: 75	Other _____	Other (specify) _____

PTO-1590 (8-01)

STIC Search Report
EIC 1700

STIC Database Tracking Number: 93401

TO: Camie Thompson
Location: CP3 11B28
May 9, 2003

Case Serial Number: 09/868351

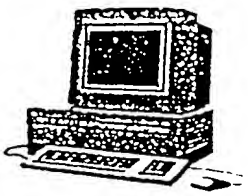
From: Kathleen Fuller
Location: EIC 1700
CP3/4 3D62
Phone: 308-4290

Kathleen.Fuller@uspto.gov

Search Notes

EIC1700

Search Results Feedback Form (Optional)



Scientific & Technical Information Center

The search results generated for your recent request are attached. If you have any questions or comments (compliments or complaints) about the scope or the results of the search, please contact *the EIC searcher* who conducted the search *or contact*:

Kathleen Fuller, Team Leader, 308-4290, CP3/4 3D62

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* ☐ *Example:* 1713

- *Relevant prior art **found**, search results used as follows:*
  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

  Types of relevant prior art found:
  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)

- *Relevant prior art **not found**:*
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Search results were not useful in determining patentability or understanding the invention.

Other Comments:

Drop off completed forms in CP3/4 - 3D62 .

```
=> FILE HCAPLUS
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FILE COVERS 1907 - 9 May 2003  VOL 138 ISS 20
FILE LAST UPDATED: 8 May 2003  (20030508/ED)

 This file contains CAS Registry Numbers for easy and accurate
 substance identification.


=> D QUE L20
L2            34 SEA FILE=REGISTRY ABB=ON  (12033-89-5/BI OR 12057-24-8/BI OR
                 12063-98-8/BI OR 12137-20-1/BI OR 126213-51-2/BI OR 1303-00-0/B
                 I OR 1306-23-6/BI OR 1306-24-7/BI OR 1313-13-9/BI OR 1314-13-2/
                 BI OR 1314-87-0/BI OR 1314-98-3/BI OR 1315-09-9/BI OR 13400-13-
                 0/BI OR 1344-28-1/BI OR 13463-67-7/BI OR 18820-29-6/BI OR
                 21651-19-4/BI OR 24304-00-5/BI OR 37320-90-4/BI OR 409-21-2/BI
                 OR 50851-57-5/BI OR 50926-11-9/BI OR 7439-93-2/BI OR 7440-05-3/
                 BI OR 7440-06-4/BI OR 7440-21-3/BI OR 7440-31-5/BI OR 7440-56-4
                 /BI OR 7440-57-5/BI OR 7440-70-2/BI OR 7631-86-9/BI OR
                 7782-49-2/BI OR 7789-24-4/BI)
L4            32 SEA FILE=REGISTRY ABB=ON  L2 NOT PMS/CI
L5            29 SEA FILE=REGISTRY ABB=ON  L4 NOT 1/AU,PD,PT
L6             1 SEA FILE=REGISTRY ABB=ON  L5 AND ITO
L7            28 SEA FILE=REGISTRY ABB=ON  L5 NOT L6
L8         79675 SEA FILE=HCAPLUS ABB=ON  LIGHT?(3A)(EMIS? OR EMIT?) OR EL OR
                 ELECTROLUMINES?
L9           779 SEA FILE=HCAPLUS ABB=ON  OLED
L10          543 SEA FILE=HCAPLUS ABB=ON  ORG?(5A)(INTERPOS? OR SANDWICH? OR
                 BETWEEN?)(3A)ELECTRODE#
L11          310 SEA FILE=HCAPLUS ABB=ON  (L8 OR L9) AND L10
L12      1571517 SEA FILE=HCAPLUS ABB=ON  L7
L13           88 SEA FILE=HCAPLUS ABB=ON  L11 AND L12
L14           88 SEA FILE=HCAPLUS ABB=ON  L13 AND (DEV/RL OR DEVICE#)
L15           79 SEA FILE=HCAPLUS ABB=ON  L14 AND LAYER?
L16            3 SEA FILE=HCAPLUS ABB=ON  L15 AND (MULTILAYER? OR PLURAL?(2A)LAY
                 ER?)(3A)ELECTRODE?
L17            1 SEA FILE=HCAPLUS ABB=ON  L15 AND INSULAT? AND CONDUCT? AND
                 SEMICONDUCT?
L18            8 SEA FILE=HCAPLUS ABB=ON  L15 AND (MULTILAYER? OR PLURAL?(2A)LAY
                 ER?)
L19           15 SEA FILE=HCAPLUS ABB=ON  L15 AND ELECTRODES/IT
L20           21 SEA FILE=HCAPLUS ABB=ON  (L16 OR L17 OR L18 OR L19)
```

```
=> FILE WPIX
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FILE LAST UPDATED:          5 MAY 2003      <20030505/UP>
MOST RECENT DERWENT UPDATE:     200329        <200329/DW>
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>>> SLART (Simultaneous Left and Right Truncation) is now
    available in the /ABEX field. An additional search field
    /BIX is also provided which comprises both /BI and /ABEX <<<

>>> PATENT IMAGES AVAILABLE FOR PRINT AND DISPLAY <<<

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    SEE http://www.derwent.com/dwpi/updates/dwpicov/index.html <<<

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    GUIDES, PLEASE VISIT:
    http://www.derwent.com/userguides/dwpi_guide.html <<<

=> D QUE L31
L8        79675 SEA FILE=HCAPLUS ABB=ON  LIGHT?(3A)(EMIS? OR EMIT?) OR EL OR
                ELECTROLUMINES?
L9          779 SEA FILE=HCAPLUS ABB=ON  OLED
L10         543 SEA FILE=HCAPLUS ABB=ON  ORG?(5A)(INTERPOS? OR SANDWICH? OR
                BETWEEN?)(3A)ELECTRODE#
L21         609 SEA FILE=WPIX ABB=ON   (L8 OR L9) AND L10
L23         552 SEA FILE=WPIX ABB=ON   L21 AND H05B033?/IC
L24          79 SEA FILE=WPIX ABB=ON   L23 AND H01L?/IC
L25       21502 SEA FILE=WPIX ABB=ON   ORG?(3A)LAYER?
L26          67 SEA FILE=WPIX ABB=ON   L24 AND L25
L27           2 SEA FILE=WPIX ABB=ON   L26 AND (MULTILAYER? OR PLURAL?(2A)LAYER?
                )
L29           2 SEA FILE=WPIX ABB=ON   L26 AND MIX?(3A)LAYER?
L30          13 SEA FILE=WPIX ABB=ON   L26 AND (FLOW?(2A)CURRENT OR CONDUCT?(3A)
                DEFECT? OR RESISTANCE OR CHARGE(2A)CARRIER?)
L31          16 SEA FILE=WPIX ABB=ON   L27 OR L29 OR L30


=> FILE INSPEC
FILE 'INSPEC' ENTERED AT 12:53:02 ON 09 MAY 2003
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FILE LAST UPDATED: 5 MAY 2003        <20030505/UP>
FILE COVERS 1969 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>
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<<< NEW DISPLAY FORMAT 'SCAN' AVAILABLE NOW >>>

=> D QUE L34
L8 79675 SEA FILE=HCAPLUS ABB=ON LIGHT?(3A)(EMIS? OR EMIT?) OR EL OR ELECTROLUMINES?
L9 779 SEA FILE=HCAPLUS ABB=ON OLED
L10 543 SEA FILE=HCAPLUS ABB=ON ORG?(5A)(INTERPOS? OR SANDWICH? OR BETWEEN?)(3A)ELECTRODE#
L34 16 SEA FILE=INSPEC ABB=ON (L8 OR L9) AND L10

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FILE LAST UPDATED: 7 MAY 2003 <20030507/UP>
FILE COVERS 1970 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN THE BASIC INDEX >>>

<<< NEW DISPLAY FORMAT 'SCAN' AVAILABLE NOW >>>

=> D QUE L35
L8 79675 SEA FILE=HCAPLUS ABB=ON LIGHT?(3A)(EMIS? OR EMIT?) OR EL OR ELECTROLUMINES?
L9 779 SEA FILE=HCAPLUS ABB=ON OLED
L10 543 SEA FILE=HCAPLUS ABB=ON ORG?(5A)(INTERPOS? OR SANDWICH? OR BETWEEN?)(3A)ELECTRODE#
L35 9 SEA FILE=COMPENDEX ABB=ON (L8 OR L9) AND L10

=> FILE JAPIO
FILE 'JAPIO' ENTERED AT 12:53:25 ON 09 MAY 2003
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FILE LAST UPDATED: 4 APR 2003 <20030404/UP>
FILE COVERS APR 1973 TO DECEMBER 26, 2002

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=> D QUE L33
L8 79675 SEA FILE=HCAPLUS ABB=ON LIGHT?(3A)(EMIS? OR EMIT?) OR EL OR ELECTROLUMINES?
L9 779 SEA FILE=HCAPLUS ABB=ON OLED
L10 543 SEA FILE=HCAPLUS ABB=ON ORG?(5A)(INTERPOS? OR SANDWICH? OR BETWEEN?)(3A)ELECTRODE#
L21 609 SEA FILE=WPIX ABB=ON (L8 OR L9) AND L10
L23 552 SEA FILE=WPIX ABB=ON L21 AND H05B033?/IC
L24 79 SEA FILE=WPIX ABB=ON L23 AND H01L?/IC
L25 21502 SEA FILE=WPIX ABB=ON ORG?(3A)LAYER?
L33 15 SEA FILE=JAPIO ABB=ON L24 AND L25

=> FILE JICST
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FILE COVERS 1985 TO 5 MAY 2003 (20030505/ED)

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=> D QUE L36
L8        79675 SEA FILE=HCAPLUS ABB=ON  LIGHT?(3A)(EMIS? OR EMIT?) OR EL OR
                ELECTROLUMINES?
L9          779 SEA FILE=HCAPLUS ABB=ON  OLED
L10         543 SEA FILE=HCAPLUS ABB=ON  ORG?(5A)(INTERPOS? OR SANDWICH? OR
                BETWEEN?)(3A)ELECTRODE#
L36           5 SEA FILE=JICST-EPLUS ABB=ON  (L8 OR L9) AND L10
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=> DUP REM L20 L31 L34 L35 L33 L36
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COPYRIGHT (C) 2003 Japan Science and Technology Corporation (JST)
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PROCESSING COMPLETED FOR L31
PROCESSING COMPLETED FOR L34
PROCESSING COMPLETED FOR L35
PROCESSING COMPLETED FOR L33
PROCESSING COMPLETED FOR L36
L37          73 DUP REM L20 L31 L34 L35 L33 L36 (9 DUPLICATES REMOVED)
```

```
=> D L37 ALL 1-73

L37  ANSWER 1 OF 73  HCAPLUS  COPYRIGHT 2003 ACS
AN   2003:58565  HCAPLUS
DN   138:115173
TI   Light emitting device and method of
     manufacturing the same
IN   Yamazaki, Shunpei
PA   Japan
SO   U.S. Pat. Appl. Publ., 28 pp.
     CODEN: USXXCO
```

KATHLEEN FULLER EIC 1700/PARKER LAW 308-4290

DT Patent
LA English
IC ICM H05B033-00
NCL 313504000
CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2003015961	A1	20030123	US 2002-191517	20020710
	JP 2003092191	A2	20030328	JP 2002-122446	20020424
PRAI	JP 2001-211454	A	20010711		
	JP 2002-122446	A	20020424		

AB **Light emitting devices** in which redn. of recombinations in a **light emitting** element is prevented by using a low-resistant electrode structure are described comprising a **light emitting** element composed of 1st and 2nd **electrodes** and an **org.** compd. **layer** that is **sandwiched between** the 1st and 2nd electrodes, and the **device** is characterized in that 1 of the 1st and 2nd electrodes has a transparent conductive film, a transparent conductive resin formed on the transparent conductive film, and a plurality of conductors formed on the transparent conductive resin. Methods of fabricating the **light emitting device** are also described. Use of the **light emitting device** in display **devices**, camera, computer etc. is indicated.

ST **light emitting device** electrode fabrication

IT **Electroluminescent devices**
(displays; **light emitting device** having low-resistant **electrodes** and method of fabrication)

IT Luminescent screens
(**electroluminescent; light emitting device** having low-resistant **electrodes** and method of fabrication)

IT Electric contacts
Electrodes
(**light emitting device** having low-resistant **electrodes** and method of fabrication)

IT Silicate glasses
RL: **DEV (Device component use)**; USES (Uses)
(substrate; **light emitting device** having low-resistant **electrodes** and method of fabrication)

IT **7440-21-3**, Silicon, uses
RL: **DEV (Device component use)**; USES (Uses)
(film; **light emitting device** having low-resistant **electrodes** and method of fabrication)

IT **7631-86-9**, Silica, uses
RL: **DEV (Device component use)**; USES (Uses)
(gate insulating film; **light emitting device** having low-resistant **electrodes** and method of fabrication)

IT **12033-89-5**, Silicon nitride, uses
RL: **DEV (Device component use)**; USES (Uses)
(protective film; **light emitting device** having low-resistant **electrodes** and method of fabrication)

L37 ANSWER 2 OF 73 JICST-EPlus COPYRIGHT 2003 JST
AN 1030187136 JICST-EPlus
TI Effect of LiF in PVCz Multi Layered Polymer LED's.
AU TANAKA YOSUKE; YOSHIHARA HIROKI; TANAKA SUIKO; KITAGAWA MASAHIKO; KOBAYASHI HIROSHI
KUSANO HIROYUKI
CS Tottori Univ., Fac. of Eng.
Industrial Technol. Inst., Tottori Prefectural Government, JPN
SO Denshi Joho Tsushin Gakkai Gijutsu Kenkyu Hokoku (IEIC Technical Report (Institute of Electronics, Information and Communication Engineers)), (2003) vol. 102, no. 601(EID2002 105-119), pp. 45-48. Journal Code: S0532B
ISSN: 0913-5685
CY Japan
LA Japanese
STA New
AB We have investigated effect of LiF layer in PVCz based polymer **light emitting** diodes. LiF was inserted **between organic** layer and **electrode**. Device structures were ITO/PVCz:Pe/LiF/Al, ITO/LiF/PVCz:Pe/Al and ITO/LiF/PVCz:Pe/LiF/Al. As a result of adjustment for LiF thickness **between organic** layer and **electrodes**, carrier injection and balance were improved. We have described effect of the LiF insertion layer on the fundamental **EL** characteristics of PVCz based PLED devices. (author abst.)

L37 ANSWER 3 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 2002:906774 HCAPLUS
DN 138:9496
TI **Electroluminescent device**
IN Frey, Gitti; Reynolds, Kieran John
PA Cambridge University Technical Services Limited, UK
SO PCT Int. Appl., 49 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01L051-20
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002095841	A2	20021128	WO 2002-GB2306	20020516
	WO 2002095841	A3	20030306		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI GB 2001-12138 A 20010518
GB 2001-23287 A 20010927

AB **Electroluminescent devices** comprising a hole-injecting electrode, an electron-injecting **electrode** and .gtoreq.1

org. light-emitting layer disposed **between** the hole injecting **electrode** and the electron injecting electrode are described which are provided with a **layered** metal chalcogenide **layer** disposed between the hole-injecting electrode and the **light-emitting layer**, the chalcogen component of the chalcogenide being chosen from sulfur, selenium, and tellurium. A method for the prodn. of an **electroluminescent device** having a **layered** metal dichalcogenide **layer** is also described which entails depositing the **layered** metal dichalcogenide on the hole injecting electrode according to the following steps: (a) intercalation of lithium atoms into the metal dichalcogenide; (b) addn. of water to the resulting intercalated material resulting in an exfoliation reaction so as to give single **layers** of the metal dichalcogenide suspended in the water; addn. of a water immiscible solvent to the product of step (b) followed by agitation of the resulting mixt. to give a thin film of **layered** metal dichalcogenide at the solvent/water interface; and (d) wetting the hole injecting **layer** supported on a substrate and then dipping it into the solvent/water interface produced in step (c) above and allowing the thin film of **layered** metal dichalcogenide to spread on the surface of the hole injecting **layer.**

ST org **electroluminescent device** metal chalcogenide hole transporting **layer**

IT Semiconductor **device** fabrication
(org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

IT Selenides
Sulfides, uses
Tellurides
RL: CPS (Chemical process); **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

IT **Electroluminescent devices**
(org.; org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

IT aluminum alloy, nonbase
barium alloy, nonbase
calcium alloy, nonbase
cerium alloy, nonbase
indium alloy, nonbase
lanthanum alloy, nonbase
lithium alloy, nonbase
magnesium alloy, nonbase
potassium alloy, nonbase
silver alloy, nonbase
sodium alloy, nonbase
strontium alloy, nonbase
tin alloy, nonbase
zinc alloy, nonbase
zirconium alloy, nonbase
RL: CPS (Chemical process); **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(**electrodes**; org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

IT 1312-43-2, Indium oxide **1314-13-2**, Zinc oxide, uses 1332-29-2, Tin oxide 50926-11-9, ITO 117944-65-7, Indium zinc oxide
RL: CPS (Chemical process); **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(electrode; org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

IT 210347-52-7, F8BT 220797-16-0 316825-94-2
RL: CPS (Chemical process); **DEV (Device component use)**; PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PYP (Physical process); PROC (Process); USES (Uses)
(org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

IT 517-51-1, Rubrene 1047-16-1, Quinacridone 1305-78-8, Calcium oxide, uses 1309-48-4, Magnesium oxide, uses 1313-59-3, Sodium oxide, uses 1314-11-0, Strontium oxide, uses 1317-33-5, Molybdenum disulfide, uses 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 7429-90-5, Aluminium, uses 7439-91-0, Lanthanum, uses 7439-95-4, Magnesium, uses 7440-09-7, Potassium, uses 7440-22-4, Silver, uses 7440-23-5, Sodium, uses 7440-24-6, Strontium, uses **7440-31-5**, Tin, uses **7440-31-5D**, Tin, chalcogenides 7440-32-6D, Titanium, chalcogenides 7440-33-7D, Tungsten, chalcogenides 7440-39-3, Barium, uses 7440-45-1, Cerium, uses 7440-58-6D, Hafnium, chalcogenides 7440-62-2D, Vanadium, chalcogenides 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-67-7D, Zirconium, chalcogenides **7440-70-2**, Calcium, uses 7440-74-6, Indium, uses 12034-77-4, Niobium diselenide. **12057-24-8**, Lithium oxide, uses 12136-45-7, Potassium oxide, uses 12143-72-5, Tantalum disulfide 18088-11-4, Rubidium oxide 20281-00-9, Cesium oxide 62503-57-5, Phenanthrene homopolymer 95270-88-5, PolyFluorene 95270-88-5D, PolyFluorene, derivs. 96638-49-2, Polyphenylene vinylene 96638-49-2D, Polyphenylene vinylene, derivs. 138184-36-8, MEH-PPV
RL: CPS (Chemical process); **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

IT **7439-93-2**, Lithium, uses
RL: CPS (Chemical process); **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses)
(org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

IT **1303-00-0**, Gallium arsenide, uses **1314-98-3**, Zinc sulfide, uses **1315-09-9**, Zinc selenide **7440-21-3**, Silicon, uses **12063-98-8**, Gallium phosphide (GaP), uses 22398-80-7, Indium phosphide, uses
RL: CPS (Chemical process); **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(substrate; org. **electroluminescent devices** with metal chalcogenide hole-transporting **layers** and their fabrication)

L37 ANSWER 4 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 2002:353954 HCAPLUS
DN 136:361635

TI **Light emitting device**
IN Seo, Satoshi
PA Japan
SO U.S. Pat. Appl. Publ., 27 pp.
CODEN: USXXCO
DT Patent
LA English
IC ICM H01J001-62
ICS H01J063-04
NCL 313504000
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2002053871	A1	20020509	US 2001-983521	20011024
	JP 2002203687	A2	20020719	JP 2001-329147	20011026
PRAI	JP 2000-327699	A	20001026		

AB **Light-emitting devices** comprising an org. **electroluminescent** element comprising an anode **layer**, a cathode **layer**, and an org. compd. **layer** provided between the anode and cathode **layers** are described in which .gtoreq.1 of the anode **layer** and the cathode **layer** has an oxide film in contact with the org. compd. **layer**. The org. **layer** may contain or be in contact with a zeolite. Methods for fabricating the **devices** are also described in which the oxide film may be formed by anodization processing or sol-gel processing. Electronic equipment (org. **electroluminescent** displays, video cameras, digital cameras, image reprodn. app., portable computers, personal computers, mobile telephones, and acoustic equipment) employing the **devices** are also described.

ST org **light emitting device** electrode oxide **layer**; zeolite org **light emitting device** electrode

IT Anodization
Semiconductor **device** fabrication
Sol-gel processing
(org. **light-emitting devices** with oxide **layers between electrodes** and **org**. **layers** and their fabrication and use)

IT Zeolites (synthetic), uses
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(org. **light-emitting devices** with oxide **layers between electrodes** and **org**. **layers** and their fabrication and use)

IT **Electroluminescent devices**
(org.; org. **light-emitting devices** with oxide **layers between electrodes** and **org**. **layers** and their fabrication and use)

IT 1314-35-8P, Tungsten oxide, uses 1314-61-0P, Tantalum oxide **13463-67-7P**, Titanium oxide, uses
RL: **DEV (Device component use)**; IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process); USES (Uses)
(org. **light-emitting devices** with oxide **layers between electrodes** and **org**

. **layers** and their fabrication and use)

IT 4733-39-5, Bathocuproine 7440-25-7, Tantalum, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 12686-52-1 50926-11-9, Indium tin oxide 151835-71-1, Poly(2-methoxy-5-octyloxy-p-phenylene vinylene)
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(org. **light-emitting devices** with oxide **layers between electrodes** and **org**
. **layers** and their fabrication and use)

IT 38874-18-9, Penta-n-propoxytantalum
RL: RCT (Reactant); RACT (Reactant or reagent)
(org. **light-emitting devices** with oxide **layers between electrodes** and **org**
. **layers** and their fabrication and use)

IT 50851-57-5
RL: **DEV (Device component use)**; MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PROC (Process); USES (Uses)
(polyethylene dioxythiophene doped with; org. **light-emitting devices** with oxide **layers between electrodes** and **org. layers** and their fabrication and use)

IT 126213-51-2, Poly(3,4-ethylenedioxythiophene)
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PROC (Process); USES (Uses)
(polystyrene sulfonate-doped; org. **light-emitting devices** with oxide **layers between electrodes** and **org. layers** and their fabrication and use)

L37 ANSWER 5 OF 73 INSPEC COPYRIGHT 2003 IEE
AN 2002:7367580 INSPEC DN A2002-20-4265P-004; B2002-10-4260D-018
TI Organic bistable **light-emitting** devices.
AU Liping Ma; Jie Liu; Pyo, S.; Yang Yang (Dept. of Mater. Sci. & Eng., California Univ., Los Angeles, CA, USA)
SO Applied Physics Letters (21 Jan. 2002) vol.80, no.3, p.362-4. 12 refs.
Doc. No.: S0003-6951(02)03003-6
Published by: AIP
Price: CCCC 0003-6951/2002/80(3)/362(3)/$19.00
CODEN: APPLAB ISSN: 0003-6951
SICI: 0003-6951(20020121)80:3L.362:OBLE;1-9
DT Journal
TC Practical; Experimental
CY United States
LA English
AB An organic bistable device, with a unique trilayer structure consisting of **organic**/metal/**organic** sandwiched **between** two outmost metal **electrodes**, has been invented. [Y. Yang, L. P. Ma, and J. Liu, U.S. Patent Pending, U.S. 01/17206 (2001)]. When the device is biased with voltages beyond a critical value (for example 3 V), the device suddenly switches from a high-impedance state to a low-impedance state, with a difference in injection current of more than 6 orders of magnitude. When the device is switched to the low-impedance state, it remains in that state even when the power is off. (This is called "nonvolatile" phenomenon in memory devices.) The high-impedance state can be recovered by applying a reverse bias; therefore, this bistable device is ideal for memory

applications. In order to increase the data read-out rate of this type of memory device, a regular polymer **light-emitting** diode has been integrated with the organic bistable device, such that it can be read out optically. These features make the organic bistable **light -emitting** device a promising candidate for several applications, such as digital memories, opto-electronic books, and recordable papers.

CC A4265P Optical bistability, multistability and switching; A4280T Optical storage and retrieval; B4260D Light emitting diodes; B4120 Optical storage and retrieval; B4150 Electro-optical devices; B4340P Optical bistability, multistability and switching

CT CHARGE INJECTION; ELECTRO-OPTICAL SWITCHES; **LIGHT EMITTING** DIODES; OPTICAL BISTABILITY; OPTICAL STORAGE; ORGANIC COMPOUNDS

ST **organic bistable light-emitting devices**; organic bistable device; trilayer structure; organic/metal/organic sandwiched; metal electrodes; critical state; high-impedance state; low-impedance state; injection current; nonvolatile phenomenon; reverse bias; data read-out rate; **polymer light-emitting diode**; digital memories; opto-electronic books; recordable papers; 3 V

PHP voltage 3.0E+00 V

ET P; J

L37 ANSWER 6 OF 73 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:449200 HCAPLUS

DN 135:53383

TI Organic **electroluminescent device** with improved long-term stability

IN Yoon, Jong Geun; Kim, Myung Seop; Oh, Hyoung Yun; Kim, Sung Tae

PA Lg Electronics Inc., S. Korea

SO U.S., 11 pp.
CODEN: USXXAM

DT Patent

LA English

IC ICM H05B033-12

NCL 428690000

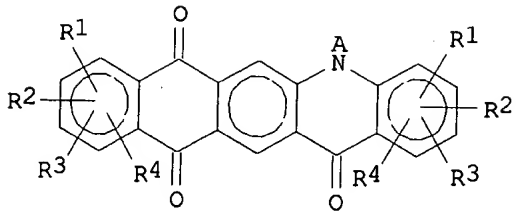
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76, 78

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6248458	B1	20010619	US 1998-178515	19981026
	US 2001031380	A1	20011018	US 2001-848282	20010504
PRAI	KR 1997-60534	A	19971117		
	KR 1998-18193	A	19980520		
	KR 1998-37215	A	19980909		
	US 1998-178515	A1	19981026		

OS MARPAT 135:53383

GI



I

AB Org. **electroluminescent devices** comprising an **org. multilayered electroluminescent** structure **sandwiched between electrodes** are described which include .gtoreq.1 **layer** comprising Li2O along with .gtoreq.1 materials described by the general formula I (R1-4 = independently selected H, C1-5 alkyl or alkoxy groups, aryl, aryloxy, or halo; .gtoreq.1 pair of adjacent substituents of R1-4 may form five- or six-membered conjugated cyclic ring; and A = independently selected H, C1-5 alkyl, or aryls) and/or .gtoreq.1 **layer** comprising Li2O along with .gtoreq.1 porphyrinic compd.

ST org **electroluminescent device** lithium oxide **layer**

IT Metalloporphyrins
Porphyrins
RL: **DEV (Device component use)**; USES (Uses)
(org. **electroluminescent devices** including lithium oxide-contg. **layers**)

IT **Electroluminescent devices**
(org.; org. **electroluminescent devices** including lithium oxide-contg. **layers**)

IT 147-14-8, Copper phthalocyanine 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 7429-90-5, Aluminum., uses **12057-24-8**, Lithium oxide, uses 50926-11-9, ITO 65181-78-4, N,N'-Diphenyl-N,N'-bis(3-methylphenyl)-1,1'-biphenyl-4,4'-diamine
RL: **DEV (Device component use)**; USES (Uses)
(org. **electroluminescent devices** including lithium oxide-contg. **layers**)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Hung; US 5677572 1997 HCAPLUS
(2) Matsuura; US 5516577 1996 HCAPLUS
(3) Murayama; US 5227252 1993 HCAPLUS
(4) Shi; US 5593788 1997 HCAPLUS
(5) Tada; US 5616427 1997 HCAPLUS

L37 ANSWER 7 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:545354 HCAPLUS
DN 135:129364
TI Organic **electroluminescent devices** and manufacture
IN Oka, Tetsuo; Ikeda, Takeshi; Hayashi, Kenji
PA Toray Industries, Inc., Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H05B033-04

ICS G09F009-00; G09F009-30; H05B033-10; H05B033-14
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001203075	A2	20010727	JP 2000-8618	20000118
PRAI	JP 2000-8618		20000118		

AB The **devices** comprise a pair of **electrodes** interleaving **between** an **org. electroluminescent** laminate, where a protective **layer** comprises a metal and an insulating **layer** comprises a compd. of the metal **layer** employed in the protective **layer.**
ST organoluminescent **device** protective insulating **layer**
IT **Electrodes**
Electroluminescent devices
Films
Glass substrates
Humidity
(org. **electroluminescent devices** and manuf.)
IT 147-14-8, Copper phthalocyanine **1344-28-1**, Alumina, uses 2085-33-8, Tris(8-quinolinolato)aluminum 7429-90-5, Aluminum, uses 50926-11-9, ITO 65181-78-4, TPD
RL: **DEV (Device component use)**; USES (Uses)
(org. **electroluminescent devices** and manuf.)

L37 ANSWER 8 OF 73 INSPEC COPYRIGHT 2003 IEE
AN 2001:6935212 INSPEC DN B2001-07-4260D-013
TI Red organic **light emitting** device made from triphenylene hexaester and perylene tetraester.
AU Seguy, I.; Jolinat, P.; Destruel, P.; Farenc, J. (Lab. de Genie Electr., Univ. Paul Sabatier, Toulouse, France); Mamy, R.; Bock, H.; Ip, J.; Nguyen, T.P.
SO Journal of Applied Physics (15 May 2001) vol.89, no.10, p.5442-8. 48 refs.
Doc. No.: S0021-8979(01)05910-2
Published by: AIP
Price: CCCC 0021-8979/2001/89(10)/5442(7)/$18.00
CODEN: JAPIAU ISSN: 0021-8979
SICI: 0021-8979(20010515)89:10L.5442:OLED;1-G
DT Journal
TC Practical; Experimental
CY United States
LA English
AB Saturated red **light emission** from organic **light emitting** diodes is less common than emission in the green or the blue. Most organic red **light emitting** devices are based on rare earth complexes, mainly europium, which are known to exhibit stability problems. The present article describes new diodes made of indium tin oxide-coated glass/triphenylene hexaether/perylene tetraester/aluminum. The band diagram was determined by ultraviolet photoemission spectroscopy, cyclic voltammetry, scanning tunneling microscopy, and absorbance measurements. The interfaces **between electrodes** and **organic** layers were investigated by X-ray photoelectron spectroscopy. The current-voltage and luminance-voltage characteristics are very reproducible from device to device, with an emission peak at 620 nm and a full width at half maximum of 80 nm, a current rectification ratio of about 30, I V2 at low voltages and I Lum V6 at higher voltages.

CC B4260D Light emitting diodes
CT **LIGHT EMITTING** DIODES; ORGANIC COMPOUNDS; RECTIFICATION; SCANNING TUNNELLING MICROSCOPY; ULTRAVIOLET PHOTOELECTRON SPECTRA; VOLTAMMETRY (CHEMICAL ANALYSIS); X-RAY PHOTOELECTRON SPECTRA
ST **red organic light emitting device**; triphenylene hexaester; perylene tetraester; **saturated red light emission**; **organic light emitting diodes**; rare earth complexes; stability problems; indium tin oxide-coated glass; band diagram; ultraviolet photoemission spectroscopy; cyclic voltammetry; scanning tunneling microscopy; absorbance measurements; X-ray photoelectron spectroscopy; luminance-voltage characteristics; current-voltage characteristics; emission peak; current rectification ratio; low voltages; ITO; Al; InSnO
CHI InSnO int, In int, Sn int, O int, InSnO ss, In ss, Sn ss, O ss; Al int, Al el
ET I; Al; In*O*Sn; In sy 3; sy 3; O sy 3; Sn sy 3; InSnO; In cp; cp; Sn cp; O cp; In; Sn; O

L37 ANSWER 9 OF 73 INSPEC COPYRIGHT 2003 IEE
AN 2001:6896063 INSPEC DN B2001-05-4260-010
TI Study on the enhancement of organic semiconducting microcavity **light emitting** devices.
AU Wang Wanlu; Liao Kejun (Dept. of Appl. Phys., Chongqing Univ., China)
SO Chinese Journal of Quantum Electronics (Feb. 2001) vol.18, no.1, p.66-9. 10 refs.
Published by: Science Press
CODEN: LDXUFI ISSN: 1007-5461
SICI: 1007-5461(200102)18:1L.66:SEOS;1-Y
DT Journal
TC Experimental
CY China
LA Chinese
AB The microcavity efficiency enhancement of organic **electroluminescent** devices was investigated. The devices consisted of the hole transporter ladder-type poly(p-phenylene) and the electron transporter 8-hydroxyquinoline aluminum with dye pyrromethene-doping. The microcavity effect could be achieved by adjusting the **organic** layer thickness **between** Al and ITO **electrodes**. The results obtained showed that the microcavity **electroluminescence** efficiency was greatly enhanced.
CC B4260 Electroluminescent devices; B4110 Optical materials; B4145 Micro-optical devices and technology
CT CAVITY RESONATORS; DYES; **ELECTROLUMINESCENT** DEVICES; MICRO-OPTICS; OPTICAL POLYMERS; OPTICAL RESONATORS; ORGANIC SEMICONDUCTORS
ST **organic semiconducting microcavity light emitting devices**; **microcavity light emitting devices**; **light emitting devices**; microcavity; efficient enhancement; **organic electroluminescent devices**; hole transporter; ladder-type poly(p-phenylene); electron transporter; 8-hydroxyquinoline aluminum; dye pyrromethene-doping; microcavity effect; organic layer thickness; Al electrode; ITO electrode; **microcavity electroluminescence efficiency**; **electroluminescence efficiency**; efficiency enhancement; Al; ITO; InSnO
CHI Al int, Al el; InSnO int, In int, Sn int, O int, InSnO ss, In ss, Sn ss, O ss
ET Al; In*O*Sn; In sy 3; sy 3; O sy 3; Sn sy 3; InSnO; In cp; cp; Sn cp; O cp; In; Sn; O

L37 ANSWER 10 OF 73 HCAPLUS COPYRIGHT 2003 ACS DUPLICATE 1

applicants

AN 2000:421440 HCAPLUS
DN 133:65837
TI Organic **light-emitting devices**
IN Carter, Julian Charles; Burroughes, Jeremy Henley; Heeks, Stephen Karl
PA Cambridge Display Technology Ltd., UK
SO PCT Int. Appl., 42 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01L051-20
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000036662	A1	20000622	WO 1999-GB4150	19991215
	W: AT, AU, BR, CA, CH, CN, CZ, DE, DK, ES, FI, GB, IL, IN, JP, KR, LU, MX, PT, RU, SE, SG, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	EP 1145337	A1	20011017	EP 1999-961189	19991215
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2002532848	T2	20021002	JP 2000-588818	19991215
	CN 1400676	A	20030305	CN 2002-142173	20020829
PRAI	GB 1998-27699	A	19981216		
	GB 1999-7120	A	19990326		
	WO 1999-GB4150	W	19991215		

AB Org. **light-emitting devices** comprising a **light-emitting org. layer** sandwiched **between** first and second **electrodes** for injecting charge carriers into the org. **layer** are described which are provided with means for limiting the current flow through any **conductive** defect in the **light-emissive** org. **layer**. The means may be incorporated in the electrodes, and may entail the use of materials or electrode structures having resistances which are sufficiently high to prevent excessive currents at **conductive** defects in the org. **light-emitting layer** while remaining low enough to avoid significant increases in the drive voltage required to operate the **devices**. Appropriate materials include mixts. of a **semiconductor** material with an **insulating** material, mixts. of a **semiconductor** material with a **conductive** material, and mixts. of an **insulating** material with a **conductive** material. Appropriate structures include **multilayered** structures including .gtoreq.1 **layer** having a high resistivity. The electrodes may also be constructed as a series of subelectrodes connected by fusible links. Methods of forming the electrodes are also described. PEDT-PSS.

ST org **electroluminescent device conductive** defect isolating electrode

IT Electric contacts
Electrodes
Electroluminescent devices
Electroluminescent devices
Semiconductor device fabrication
(org. **light-emitting devices** with electrode structures for isolating **conductive** defects)

IT **409-21-2**, Silicon carbide, uses **1303-00-0**, Gallium arsenide, uses **1306-23-6**, Cadmium sulfide, uses **1306-24-7**, Cadmium selenide, uses **1313-13-9**, Manganese dioxide, uses **1314-13-2**, Zinc oxide (ZnO), uses **1314-87-0**, Lead sulfide (PbS) **1314-98-3**, Zinc sulfide, uses **1315-09-9**, Zinc selenide **1344-28-1**, Alumina, uses **7439-93-2**, Lithium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses **7440-21-3**, Silicon, uses **7440-31-5**, Tin, uses **7440-56-4**, Germanium, uses 7440-57-5, Gold, uses **7440-70-2**, Calcium, uses **7631-86-9**, Silica, uses **7782-49-2**, Selenium, uses **7789-24-4**, Lithium fluoride (LiF), uses **12033-89-5**, Silicon nitride, uses **12057-24-8**, Lithium oxide, uses **12063-98-8**, Gallium phosphide (GaP), uses **12137-20-1**, Titanium monoxide **13400-13-0**, Cesium fluoride (CsF) **13463-67-7**, Titanium dioxide, uses **18820-29-6**, Manganese sulfide **21651-19-4**, Tin monoxide **24304-00-5**, Aluminum nitride (AlN) **37320-90-4**, Manganese selenide 50926-11-9, Indium tin oxide
RL: **DEV (Device component use)**; USES (Uses)
(org. **light-emitting devices** with electrode structures for isolating **conductive** defects)

IT 50851-57-5
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(polyethylene dioxythiophene doped with; org. **light-emitting devices** with electrode structures for isolating **conductive** defects)

IT 126213-51-2
RL: **DEV (Device component use)**; USES (Uses)
(polystyrene sulfonate-doped; org. **light-emitting devices** with electrode structures for isolating **conductive** defects)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Cambridge Display Tech; EP 0901176 A 1999 HCAPLUS
(2) Eastman Kodak Co; EP 0903964 A 1999 HCAPLUS
(3) Gyotoku, A; PROCEEDINGS OF THE 1997 INTERNATIONAL CONFERENCE ON ELECTROLUMINESCENCE OF MOLECULAR MATERIALS AND RELATED PHENOMENA 1997, V91(1-3), P73
(4) Gyotoku, A; Synth Met; Synthetic Metals 1997, P73
(5) Haight, R; US 5739545 A 1998 HCAPLUS
(6) Jabbour, G; APPLIED PHYSICS LETTERS 1998, V73(9), P1185 HCAPLUS
(7) Kitabayashi, M; US 4647813 A 1987
(8) Uniax Corp; WO 9732452 A 1997 HCAPLUS

L37 ANSWER 11 OF 73 HCAPLUS COPYRIGHT 2003 ACS DUPLICATE 2
AN 2000:421439 HCAPLUS
DN 133:65836
TI Organic **light-emitting devices**
IN Heeks, Stephen Karl; Burroughes, Jeremy Henley; Carter, Julian Charles
PA Cambridge Display Technology Ltd., UK
SO PCT Int. Appl., 18 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01L051-20
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000036661	A1	20000622	WO 1999-GB4144	19991214
	W: AT, AU, BR, CA, CH, CN, CZ, DE, DK, ES, FI, GB, IL, IN, JP, KR, LU, MX, PT, RU, SE, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	EP 1145336	A1	20011017	EP 1999-959554	19991214
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2002532847	T2	20021002	JP 2000-588817	19991214
PRAI	GB 1998-27827	A	19981217		
	GB 1999-22723	A	19990924		
	WO 1999-GB4144	W	19991214		

AB Org. **light-emitting device** comprising a **layer** of **light-emissive org.** material **interposed between** a first **electrode** and a second electrode, at least one of the first and second electrodes comprising one or more electrode **layers** on the **layer** of **light-emissive** org. material for injecting charge carriers into the **light-emissive** org. material, wherein the org. **light-emitting device** further comprises a **layer** of dielec. material on the surface of the outermost electrode **layer** remote from the **layer** of **light-emissive** org. material. Org. **light-emitting devices** comprising an **org.** emitting structure sandwiched **between** first and second **electrodes** are described which are provided with a capping **layer** formed of a dielec. or other inert material on the surface of the outermost electrode (e.g., the cathode); .gtoreq.1 gettering **layers** may be provided between the capping **layer** and the electrode to absorb moisture and O2. The capping **layer** may have a **multilayer** structure including addnl. inert barrier **layers** (e.g., an Al **layer** underlying an upper AlN **layer**). Methods for fabricating the **devices** including the deposition of the inert barrier **layers** using a vacuum evapn. technique are also described.

ST org **electroluminescent device** electrode protective cap

IT **Electroluminescent devices**
Electroluminescent devices
Semiconductor **device** fabrication
(org. **light-emitting devices** with protective capping **layers** overlying their electrode structures)

IT 1304-28-5, Barium oxide (BaO), uses **7439-93-2**, Lithium, uses 7440-39-3, Barium, uses 7440-46-2, Cesium, uses **7440-70-2**, Calcium, uses 12798-95-7
RL: **DEV (Device component use)**; USES (Uses)
(gettering **layer**; org. **light-emitting devices** with protective capping **layers** overlying their electrode structures)

IT **1344-28-1**, Alumina, uses 7429-90-5, Aluminum, uses **7631-86-9**, Silica, uses **12033-89-5**, Silicon nitride, uses **24304-00-5**, Aluminum nitride 96638-49-2, Polyphenylene vinylene 113443-18-8, Silicon monoxide 138184-36-8, MEH-PPV
RL: **DEV (Device component use)**; USES (Uses)

(org. **light-emitting devices** with protective capping **layers** overlying their electrode structures)
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; PATENT ABSTRACTS OF JAPAN 1995, V1995(10)
(2) Cambridge Display Tech; WO 9810473 A 1998 HCAPLUS
(3) Fed Corp; WO 9859528 A 1998 HCAPLUS
(4) Fed Corp; WO 9902277 A 1999 HCAPLUS
(5) Idemitsu Kosan Co Ltd; JP 07169567 A 1995
(6) Motorola Inc; EP 0741419 A 1996 HCAPLUS
(7) Motorola Inc; EP 0777280 A 1997 HCAPLUS

L37 ANSWER 12 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:590056 HCAPLUS
DN 133:185328
TI Organic **EL light emitting** element with **light emitting layers** and intermediate conductive **layer**
IN Tanaka, Shosaku; Hosakawa, Chishio
PA Idemitsu Kosan Co., Ltd., Japan
SO U.S., 15 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM H01J063-04
NCL 313506000
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 74, 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6107734	A	20000822	US 1998-161503	19980928
PRAI	US 1998-161503		19980928		

AB Org. **electroluminescent** elements are described which comprise a transparent electrode; an electrode arranged opposite the transparent **electrode**; an intermediate conductive **layer**; and a **plurality** of **org. light emitting layers** arranged **between** the **electrodes** in a manner to sandwich the intermediate conductive **layer** in an intermediate position. **Devices** in which the elements are arranged as pixels in 1- or 2-dimensional arrays are also described. The intermediate conductive **layers** allow individual elements to be connected in series with one another.
ST org **electroluminescent device** intermediate conductive **layer** series connection
IT **Electroluminescent devices**
(org. **electroluminescent** elements with intermediate conductive **layers** for series connection)
IT 2085-33-8 **7439-93-2**, Lithium, uses 50926-11-9, Indium tin oxide 117944-65-7, Indium zinc oxide 123847-85-8, N,N'-Bis(1-naphthyl)-N,N'-diphenyl-4,4'-benzidine 124729-98-2, 4,4',4''-Tri{N-(methylphenyl)-N-phenyl amino}triphenylamine 288584-84-9, V 259
RL: **DEV (Device component use)**; USES (Uses)
(org. **electroluminescent** elements with intermediate conductive **layers** for series connection)
RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Kusaka; US 5896006 1999

L37 ANSWER 13 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:89609 HCAPLUS
DN 132:144233
TI Organic **electroluminescent devices** having electrically insulating films
IN Yamamoto, Hitoshi; Shirasaki, Tomoyuki
PA Casio Computer Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 3 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H05B033-22
ICS H05B033-14
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000040592	A2	20000208	JP 1998-219896	19980721
PRAI	JP 1998-219896		19980721		

AB The **devices** have elec. insulating thin films **between** electron-injecting **electrodes** and **org. electroluminescent layers**. The electrodes and the insulating films are transparent to UV light. The **devices** show improved emission starting voltage and luminescent efficiency because of improvement of electron-injection efficiency.
ST **electroluminescent device** transparent elec insulating film; electron injection efficiency org **electroluminescent device**
IT Dielectric films
Electroluminescent devices
(org. **electroluminescent devices** having transparent elec. insulating films with high luminescent efficiency)
IT 50926-11-9, ITO
RL: **DEV (Device component use)**; USES (Uses)
(**electrodes**; org. **electroluminescent devices** having transparent elec. insulating films with high luminescent efficiency)
IT 147-14-8, Copper phthalocyanine 1305-78-8, Calcium oxide, uses 1309-48-4, Magnesium oxide, uses 1314-36-9, Yttrium oxide (Y2O3), uses **1344-28-1**, Alumina, uses 7783-40-6, Magnesium fluoride **7789-24-4**, Lithium fluoride, uses 7789-75-5, Calcium fluoride, uses **12057-24-8**, Lithium oxide, uses 20667-12-3, Silver oxide (Ag2O)
RL: **DEV (Device component use)**; USES (Uses)
(org. **electroluminescent devices** having transparent elec. insulating films with high luminescent efficiency)

L37 ANSWER 14 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:89608 HCAPLUS
DN 132:158992
TI Organic **electroluminescent devices** for high-contrast displays
IN Tamura, Shinichiro
PA Sony Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H05B033-22
ICS H05B033-14; H05B033-26
CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 73
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000040591	A2	20000208	JP 1998-205516	19980721
	US 6410168	B1	20020625	US 1999-352751	19990714
	KR 2000011851	A	20000225	KR 1999-29439	19990721
PRAI	JP 1998-205516	A	19980721		

AB The **devices** have **org. electroluminescent layers between** 1st **electrode layers** and 2nd electrode **layers** with UV reflectivity .ltoreq.50%. The **devices** may have low-reflection **layers** or elec. conducting **layers** as electrodes on the 2nd electrode **layers**. Mirror reflection of the 2nd electrode **layers** is decreased.

ST **electroluminescent** display metal electrode reflection prevention; antireflective film **electroluminescent** display contrast improvement; elec conducting **layer electroluminescent** display contrast improvement

IT Carbon black, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(colorants, low-reflection **layers**; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT Polyacetylenes, uses
Polyanilines
RL: **DEV (Device component use)**; USES (Uses)
(elec. conducting **layers**; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT Films
Films
(elec. conductive; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT Electric conductors
Electric conductors
(films; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT Polymers, uses
RL: **DEV (Device component use)**; USES (Uses)
(polythiophenes, elec. conducting **layers**; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT Antireflective films
Electroluminescent devices
(prevention of reflection of metal **electrodes** in org.

electroluminescent devices for high-contrast displays)

IT 9004-34-6, Cellulose, uses
RL: **DEV (Device component use)**; USES (Uses)
(binders of low-reflection **layers**; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT 13007-86-8, Aniline black
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(colorants, low-reflection **layers**; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT **409-21-2**, Silicon carbide, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-24-6, Strontium, uses **7440-31-5**, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-41-7, Beryllium, uses 7440-47-3, Chromium, uses 7440-50-8, Copper, uses 117944-65-7, Indium zinc oxide
RL: **DEV (Device component use)**; USES (Uses)
(elec. conducting **layers**; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT 1332-29-2, Tin oxide 7429-90-5, Aluminum, uses **7439-93-2**, Lithium, uses 7439-95-4, Magnesium, uses **7440-70-2**, Calcium, uses 12798-95-7 50926-11-9, ITO 257906-19-7, Magnesium 97, silver 3.2
RL: **DEV (Device component use)**; USES (Uses)
(**electrodes**; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT 128-69-8, Perylenetetracarboxylic anhydride 147-14-8, Copper phthalocyanine 13775-53-6, Sodium fluoroaluminate (Na3AlF6)
RL: **DEV (Device component use)**; USES (Uses)
(low-reflection **layers**; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

IT 12597-68-1, Stainless steel, uses
RL: **DEV (Device component use)**; USES (Uses)
(sealing containers; prevention of reflection of metal **electrodes** in org. **electroluminescent devices** for high-contrast displays)

L37 ANSWER 15 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2001-090954 [10] WPIX
DNN N2001-068949 DNC C2001-026648
TI Statistical copolymer systems useful as e.g. electrically conducting material in electrophotography comprises covalently linked polymer chains bearing an electrically active organic substitution.
DC A14 A85 L03 S06 U11 U12 X12 X15
IN FEAST, W J; PEACE, R J; SAGE, I C; WOOD, E L
PA (QINE-N) QINETIQ LTD; (MINA) UK SEC FOR DEFENCE
CYC 22
PI WO 2000069931 A1 20001123 (200110)* EN 42p C08F212-14
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: GB JP KR US
GB 2363384 A 20011219 (200203) C08F212-14

EP 1183287 A1 20020306 (200224) EN C08F212-14
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
KR 2001114262 A 20011231 (200240) C08F212-14
JP 2002544345 W 20021224 (200313) 50p C08F212-32
ADT WO 2000069931 A1 WO 2000-GB1636 20000427; GB 2363384 A WO 2000-GB1636 20000427, GB 2001-24379 20011011; EP 1183287 A1 EP 2000-927461 20000427, WO 2000-GB1636 20000427; KR 2001114262 A KR 2001-714415 20011112; JP 2002544345 W JP 2000-618346 20000427, WO 2000-GB1636 20000427
FDT GB 2363384 A Based on WO 200069931; EP 1183287 A1 Based on WO 200069931; JP 2002544345 W Based on WO 200069931
PRAI GB 1999-10963 19990512
IC ICM C08F212-14; C08F212-32
ICS C08F226-00; H01B001-12; **H01L051-00; H05B033-12; H05B033-14; H05B033-22**
AB WO 200069931 A UPAB: 20010220
NOVELTY - Statistical copolymer systems comprising covalently linked polymer chains bearing an electrically active organic substitution are new.

DETAILED DESCRIPTION - Statistical copolymer systems comprising covalently linked polymer chains bearing the electrically active organic substitution of formula: ((-C(A)(X)CH2)m-(CH2-C(B)(Z)-)j)Q (I) is new.
m = 0.1 - 0.9;
j = 1 - m;
Q = 10 - 50,000;
A and B = hole and electron transporting groups statistically distributed along the polymer chain;
X and Z = H, CN, F, Cl, Br, CO2CH3.

An INDEPENDENT CLAIM is also included for an organic semiconductor device/photorefractive device comprising a substrate bearing an **organic layer sandwiched between electrode** structures. The **organic layer** comprises the statistical copolymer.

USE - As electrically conducting and electronically active materials useful as sensitive layers in electrophotography, photocopying and printing applications and in semi-conductor devices or photosensitive devices e.g. photodiodes, photovoltaic cells or photoreflective layers.

ADVANTAGE - (I) has a high charge transport characteristics, combination of electronic work function which is one factor determining the electric potential required to inject charge in to the polymer from a metallic or semiconducting electrode, **charge carrier** mobility, the ability to afford control over emission wavelength and bandwidth, ease of synthesis from readily available and in expensive starting materials, solubility, film forming ability and high physical and chemical stability of deposited films of the polymer in storage and in operating devices. The polymers unexpectedly show excellent solubility in common solvents and may be processed into uniform films suitable for device fabrication simply by spin coating from solution and therefore satisfy the requirements for fabrication of organic semiconductor devices in large areas by inexpensive and rapid processing methods.
Dwg.0/15
FS CPI EPI
FA AB; GI
MC CPI: A12-E07C; A12-L05D; A12-W07; L03-A02D; L03-C02C; L04-A04; L04-E05
EPI: S06-A01A1; U11-A01F; U12-A01A1X; U12-A02A2X; U12-A02B5X; U12-B03C; X12-D01C; X12-D01C1; X15-A02A

L37 ANSWER 16 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2001-015605 [02] WPIX

DNN N2001-011883 DNC C2001-004089
TI Organic **electroluminescent** device, e.g. **light-emitting** diode useful for flat panel display, has **charge carrier** injection layer containing complex fluoride of two different metals.
DC E12 E14 L03 U11 U12
IN KANITZ, A; STOESSEL, M
PA (SIEI) OSRAM OPTO SEMICONDUCTORS GMBH & CO OHG; (SIEI) SIEMENS AG
CYC 25
PI WO 2000057499 A1 20000928 (200102)* DE 28p H01L051-20 <--
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: CA CN JP KR US
EP 1171921 A1 20020116 (200207) DE H01L051-20 <--
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
KR 2001109321 A 20011208 (200237) H05B033-26 <--
CN 1344428 A 20020410 (200249) H01L051-20 <--
JP 2002540566 W 20021126 (200307) 23p H05B033-22 <--
TW 488185 A 20020521 (200320) H05B033-00 <--
ADT WO 2000057499 A1 WO 2000-DE783 20000313; EP 1171921 A1 EP 2000-920388 20000313, WO 2000-DE783 20000313; KR 2001109321 A KR 2001-712135 20010924; CN 1344428 A CN 2000-805374 20000313; JP 2002540566 W JP 2000-607288 20000313, WO 2000-DE783 20000313; TW 488185 A TW 2000-105059 20000320
FDT EP 1171921 A1 Based on WO 200057499; JP 2002540566 W Based on WO 200057499
PRAI DE 1999-19913350 19990324
IC ICM **H01L051-20; H05B033-00; H05B033-22; H05B033-26**
ICS **H05B033-04; H05B033-14**
AB WO 200057499 A UPAB: 20010110
NOVELTY - Organic **electroluminescent** device, especially organic **light-emitting** diode, has a transparent bottom electrode on a substrate, a top metal electrode, **organic** functional **layer**(s) and a **charge carrier** injection layer containing a complex fluoride of 2 different metals comprising (a) lithium, sodium, potassium, magnesium or calcium and (b) magnesium, aluminum, calcium, zinc, silver, antimony, barium, samarium or ytterbium.

DETAILED DESCRIPTION - Organic **electroluminescent** device (**OLED**), especially organic **light-emitting** diode, has a transparent bottom electrode on a substrate, a top electrode of metal inert towards oxygen and humidity, **organic** functional **layer**(s) **between** the **electrodes** and a **charge carrier** injection layer containing a complex fluoride of 2 different metals of composition (I).

(Me1)(Me2)Fm+n (I)

m, n = integers corresponding to the valencies of Me1 and Me2;

Me1 = lithium (Li), sodium (Na), potassium (K), magnesium (Mg) or calcium (Ca);

Me2 = Mg, aluminum (Al), Ca, zinc (Zn), silver (Ag), antimony (Sb), barium (Ba), samarium (Sm) or ytterbium (Yb), provided Me1 not = Me2.

USE - The organic **light-emitting** diodes (OLEDs) are useful for flat panel displays, e.g. for mobile and portable electronic equipment.

ADVANTAGE - The complex fluoride layer makes hermetic sealing of the top electrode unnecessary and also extends the range of materials that can be used on the cathode side.

DESCRIPTION OF DRAWING(S) - The drawing shows the **OLED** display described in the example.

Glass substrate 21

ITO film 22
m-TPD film 23
Alq3 film 24
LiAlF4 film 25
Top electrode of aluminum 26
Dwg.2/5
FS CPI EPI
FA AB; GI; DCN
MC CPI: E05-B03; E10-B01A4; E31-M; E33-B; E33-G; E34; E35-B; E35-C; L03-G05; L04-E03; L04-E03A
EPI: U11-C18B4; U12-A01A1; U12-E02

L37 ANSWER 17 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2000-602165 [57] WPIX
DNN N2000-445532 DNC C2000-180267
TI Organic electro-luminescent device includes **light emitting** layer with high **resistance** conductive path to transport holes and block electrons.
DC L03 U14 X26
IN ARAI, M
PA (DENK) TDK CORP
CYC 23
PI WO 2000056123 A1 20000921 (200057)* JA 50p H05B033-22 <--
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: CN KR
JP 2000268973 A 20000929 (200063) 16p H05B033-22 <--
US 6249085 B1 20010619 (200137) H01L035-24 <--
EP 1117277 A1 20010718 (200142) EN H05B033-22 <--
R: DE FR GB IT NL
CN 1297671 A 20010530 (200156) H05B033-22 <--
TW 439391 A 20010607 (200175) H05B033-22 <--
KR 2001071252 A 20010728 (200208) H05B033-22 <--
ADT WO 2000056123 A1 WO 1999-JP3393 19990625; JP 2000268973 A JP 1999-71784 19990317; US 6249085 B1 US 1999-339881 19990625; EP 1117277 A1 EP 1999-926811 19990625, WO 1999-JP3393 19990625; CN 1297671 A CN 1999-805179 19990625; TW 439391 A TW 1999-110779 19990625; KR 2001071252 A KR 2000-712707 20001113
FDT EP 1117277 A1 Based on WO 200056123
PRAI JP 1999-71784 19990317
IC ICM **H01L035-24; H05B033-22**
ICS C09K011-06; **H05B033-14**
AB WO 200056123 A UPAB: 20001109
NOVELTY - An organic **EL** device comprises a hole injection electrode (2) and an electron injection **electrode** (6) with an **organic layer** (4) **between** the **electrodes** (2,6). A **light emitting** layer contains a conjugated polymer, and an inorganic hole injection **layer** (3) between the **organic layer** (4) and the hole injection electrode (2). A conductive path blocks electrons and transports holes, and has a high **resistance**.
USE - Electro-luminescent device.
ADVANTAGE - The organic electro-luminescent device has high efficiency, long life, and can be produced at low cost
Dwg.1/4
FS CPI EPI
FA AB; GI
MC CPI: L03-C
EPI: U14-J02; X26-J

L37 ANSWER 18 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2000-595714 [57] WPIX
DNN N2000-441261 DNC C2000-178101
TI Organic **electroluminescent** device having inorganic/organic junction structure has high **resistance** inorganic hole-injecting layer between hole-injecting electrode and **light-emitting organic layer**.
DC L03 U14 X26
IN ARAI, M; KOBORI, I; MITSUHASHI, E
PA (DENK) TDK CO LTD; (DENK) TDK CORP
CYC 29
PI EP 1041654 A1 20001004 (200057)* EN 16p H01L051-20 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2000294376 A 20001020 (200059) 13p H05B033-22 <--
CN 1269690 A 20001011 (200103) H05B033-00 <--
KR 2001014660 A 20010226 (200156) H05B033-22 <--
TW 443075 A 20010623 (200206) H05B033-22 <--
KR 338251 B 20020527 (200277) H05B033-22 <--
ADT EP 1041654 A1 EP 2000-302731 20000331; JP 2000294376 A JP 1999-96212 19990402; CN 1269690 A CN 2000-108665 20000331; KR 2001014660 A KR 2000-16452 20000330; TW 443075 A TW 2000-106190 20000401; KR 338251 B KR 2000-16452 20000330
FDT KR 338251 B Previous Publ. KR 2001014660
PRAI JP 1999-96212 19990402
IC ICM **H01L051-20; H05B033-00; H05B033-22**
ICS **H05B033-14**
AB EP 1041654 A UPAB: 20001109
NOVELTY - **Light-emitting organic layer** is located **between** hole-injecting **electrode** and negative electrode. High **resistance** inorganic hole-injecting layer located between the hole-injecting electrode and the **organic layer** contains silicon oxide and/or germanium oxide as a main component and a conductive oxide with resistivity up to 1 multiply 1010 Ohm -cm.

DETAILED DESCRIPTION - The main component of the high **resistance** inorganic hole-injecting layer is represented by the formula: (Si1-xGex)Oy, where x = 0-1, and y = 1.7-2.2.

The conductive oxide comprises at least one oxide selected from those of In, Zn, Ru and V.

An inorganic insulative electron injecting and transporting layer can be located between the **organic layer** and the negative electrode, and it contains, as main component, at least one oxide selected from strontium oxide, magnesium oxide, calcium oxide, lithium oxide, rubidium oxide, potassium oxide, sodium oxide, and cesium oxide.

USE - Organic **electroluminescent** device.

ADVANTAGE - Improved hole injection efficiency, efficient hole-electron recombination in **light-emitting** layer, high **light emission** efficiency, low operating voltage, and low cost.

DESCRIPTION OF DRAWING(S) - The drawing shows the configuration of an organic **electroluminescent** device according to an embodiment of the invention.

Drive power supply E
Hole-injecting electrode 2
Electron-injecting electrode 3
Light-emitting layer 5

Dwg.1/4
FS CPI EPI
FA AB; GI
MC CPI: L03-G05; L04-E03
EPI: U14-J; X26-J

L37 ANSWER 19 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2000-453929 [40] WPIX
DNN N2000-338153 DNC C2000-138442
TI Low cost low operating voltage organic electro luminescent device with improved electron injection and luminous efficiency comprising an high **resistance** inorganic electron injecting layer capable of hole blocking.
DC L03 U14
IN ARAI, M; KOBORI, I; MITSUHASHI, E; YAMAMOTO, H
PA (DENK) TDK CORP
CYC 30
PI EP 1022788 A2 20000726 (200040)* EN 13p H01L051-20 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2000215983 A 20000804 (200042) 12p H05B033-22 <--
CN 1261249 A 20000726 (200057) H05B033-14 <--
KR 2000052291 A 20000816 (200121) H05B033-14 <--
TW 421976 A 20010211 (200146) H05B033-22 <--
US 6281627 B1 20010828 (200151) H01J001-62
KR 323777 B 20020219 (200257) H05B033-14 <--
ADT EP 1022788 A2 EP 1999-305046 19990625; JP 2000215983 A JP 1999-13666 19990121; CN 1261249 A CN 1999-111100 19990625; KR 2000052291 A KR 1999-24287 19990625; TW 421976 A TW 1999-110781 19990625; US 6281627 B1 US 1999-234704 19990121; KR 323777 B KR 1999-24287 19990625
FDT KR 323777 B Previous Publ. KR 2000052291
PRAI JP 1999-13666 19990121
IC ICM H01J001-62; **H01L051-20**; **H05B033-14**; **H05B033-22**
ICS H01J063-04; **H05B033-12**
AB EP 1022788 A UPAB: 20000823
NOVELTY - The organic **EL** comprises a high **resistance** inorganic electron injecting layer between the hole injecting and the **organic light emitting layer** (4).
DETAILED DESCRIPTION - The inorganic layer comprises an alkali metal, alkaline earth, or lanthanide oxide with a specified work function as a first component and a metallic element with a second specified work function as a second component. The inorganic layer has hole blocking characteristics and conduction paths for carrying electrons improving the efficiency of the device. Organic **EL** device comprises:
(a) hole injecting electrode (2);
(b) electron injecting electrode (3);
(c) at least one **organic layer between** the **electrodes** with at least one layer having a **light emitting** function (5); and
(d) high **resistance** inorganic electron injecting layer (6) between the electron injecting electrode and the **light emitting** layer comprising a first component selected from oxide of alkali metal, alkaline earth, and lanthanide elements with a work function at most 4 eV, and a second component selected from metal with work function = 3 - 5 eV, the layer being capable of blocking holes and having a conduction path for carrying electrons.
USE - Organic **EL** devices for displays.

ADVANTAGE - The device has excellent electron injection efficiency, improved luminous efficiency, low operating voltage, and low cost.
DESCRIPTION OF DRAWING(S) - The drawing shows an organic electro luminescent device
substrate 1
hole injecting electrode 2
electron injecting electrode 3
hole injecting and transporting layer 4
light emitting layer 5
high **resistance** inorganic electron injecting layer 6
Dwg.1/4
FS CPI EPI
FA AB; GI
MC CPI: L03-C04
EPI: U14-J02

L37 ANSWER 20 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2000-444459 [39] WPIX
DNN N2000-331616 DNC C2000-135409
TI Organic **electroluminescent** device has inorganic insulative hole injecting and tranporting layer between hole injecting electrode and **light emitting** layer.
DC L03 U14
IN ARAI, M; KOBORI, I; MITSUHASHI, E
PA (DENK) TDK CORP
CYC 27
PI EP 1020939 A2 20000719 (200039)* EN 11p H01L051-20 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2000208277 A 20000728 (200041) 10p H05B033-22 <--
US 6208076 B1 20010327 (200119) H01L033-00 <--
ADT EP 1020939 A2 EP 1999-305050 19990625; JP 2000208277 A JP 1999-6874 19990113; US 6208076 B1 US 1999-229569 19990113
PRAI JP 1999-6874 19990113
IC ICM **H01L033-00; H01L051-20; H05B033-22**
ICS **H05B033-00; H05B033-14**
AB EP 1020939 A UPAB: 20000818
NOVELTY - The inorganic insulative hole injecting and transporting layer (4b) comprises silicon oxide and/or germanium oxide having an average composition of formula (Si1-xGex)Oy where 0 at most x at most 1 and 1 less than y at most 2.
DETAILED DESCRIPTION - The organic **electroluminescent** device comprises a hole injecting electrode, a negative electrode and at least two **organic layers between** the **electrodes**. The **organic layers** include a **light emitting** layer (5). The device further includes a hole injecting and transporting layer (4a) containing a hole transporting organic material and an inorganic insulative hole injecting and transporting layer (4b) between the hole injecting electrode and the **light emitting** layer. The inorganic insulative hole injecting and transporting layer comprises silicon oxide and/or germanium oxide having an average composition of formula (Si1-xGex)Oy where 0 at most x at most 1 and 1 less than y at most 2. Preferably the inorganic hole injecting and transporting layer has a thickness of up to 5 nm.
USE - For organic **electroluminescent** device.
ADVANTAGE - The device has an improved performance, a long life, weather **resistance**, high stability, high efficiency and low cost.

DESCRIPTION OF DRAWING(S) - The drawing shows a cross-section of the device.
Substrate 1
Hole injecting electrode 2
Electron injecting electrode 3
Organic hole injecting and transporting layer 4a
Inorganic insulative hole injecting and transporting layer 4b
Light emitting layer 5
Dwg.1/4

FS CPI EPI
FA AB; GI
MC CPI: L03-C02; L03-G05; L03-H04A
EPI: U14-J02

L37 ANSWER 21 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2000-444458 [39] WPIX
DNN N2000-331615 DNC C2000-135408
TI Organic **electroluminescent** device having inorganic insulative electron injecting and transporting layer between negative electrode and **light emitting** layer.
DC L03 U14
IN ARAI, M; KOBORI, I; MITSUHASHI, E
PA (DENK) TDK CORP
CYC 27
PI EP 1020938 A2 20000719 (200039)* EN 14p H01L051-20 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2000208276 A 20000728 (200041) 12p H05B033-22 <--
US 6198219 B1 20010306 (200115) H01L033-00 <--
ADT EP 1020938 A2 EP 1999-305047 19990625; JP 2000208276 A JP 1999-6873 19990113; US 6198219 B1 US 1999-229562 19990113
PRAI JP 1999-6873 19990113
IC ICM **H01L033-00; H01L051-20; H05B033-22**
ICS **H05B033-00; H05B033-10; H05B033-14**
AB EP 1020938 A UPAB: 20000818
NOVELTY - The inorganic insulative electron injecting and transporting layer (5a) comprises at least one oxide selected from lithium, rubidium, potassium, sodium, cesium, strontium, magnesium and calcium oxide as a main component and silicon oxide and/or germanium oxide as a stabiliser.
DETAILED DESCRIPTION - The device comprises a substrate (1), a hole injecting electrode and a negative electrode formed on the substrate, and an **organic layer** containing an **organic** material **between** the **electrodes** and including a **light emitting** layer (4). The device further comprises an electron injecting and transporting layer containing an electron transporting organic material and an inorganic insulative electron injecting and transporting layer (5a) formed on an inorganic material between the negative electrode (6) and the **light emitting** layer. The inorganic insulative electron injecting and transporting layer comprises at least one oxide selected from lithium, rubidium, potassium, sodium, cesium, strontium, magnesium and calcium oxide as a main component and silicon oxide and/or germanium oxide as a stabiliser.
USE - For organic **electroluminescent** device.
ADVANTAGE - The device has improved performance, a high efficiency, long life weather **resistance** and high stability.
DESCRIPTION OF DRAWING(S) - The drawing shows a cross-sectional view of the device.

Substrate 1
Hole injecting electrode 2
Light emitting layer 4
Inorganic insulative electron injecting layer 5a
Organic electron injecting and transporting layer 5b
Negative electrode or electron injecting electrode 6
Dwg.1/4
FS CPI EPI
FA AB; GI
MC CPI: L03-C02; L03-G05; L03-H04A
EPI: U14-J02

L37 ANSWER 22 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2000-389345 [34] WPIX
DNN N2000-291549 DNC C2000-118416
TI Organic **electroluminescent** device includes an **organic light emitting layer** located between an inorganic electron injecting and transporting layer and an inorganic insulative hole injecting and transporting layer.
DC L03 U14 X26
IN ARAI, M; KOBORI, I; MITSUHASHI, E
PA (DENK) TDK CORP
CYC 27
PI EP 1009045 A2 20000614 (200034)* EN 13p H01L051-20 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2000173776 A 20000623 (200036) 11p H05B033-22 <--
US 6296954 B1 20011002 (200160) H05B033-00 <--
ADT EP 1009045 A2 EP 1999-305044 19990625; JP 2000173776 A JP 1998-363790 19981207; US 6296954 B1 US 1999-235379 19990122
PRAI JP 1998-363790 19981207
IC ICM **H01L051-20; H05B033-00; H05B033-22**
ICS **H05B033-14**
AB EP 1009045 A UPAB: 20000718
NOVELTY - An organic luminescent device includes an **organic light emitting layer** (5) between an inorganic electron injecting and transporting layer (6) and an inorganic insulative hole injecting and transporting layer (4).
DETAILED DESCRIPTION - An organic luminescent device comprises:
(a) a substrate (1);
(b) a hole injecting electrode (2) and negative electrode (3) formed on the substrate;
(c) a **light emitting layer** (5) containing an **organic** material **between** the **electrodes;**
(d) an inorganic electron injecting and transporting layer (6) between the **light emitting** layer and the negative electrode;
and
(e) an inorganic insulative hole injecting and transporting layer (4) between the **light emitting** layer and the hole injecting electrode.
The inorganic electron injecting and transporting layer comprises at least one oxide selected from strontium oxide, magnesium oxide, calcium oxide, lithium oxide, rubidium oxide, potassium oxide, sodium oxide, and cesium oxide as a main component.
The inorganic insulative hole injecting and transporting layer comprises silicon oxide or germanium oxide or a mixture of these as a main

component. The main component is of formula (I):
where 0 at most x at most 1; and 1.7 at most y at most 1.99, as analyzed by Rutherford back-scattering.
USE - None given.
ADVANTAGE - The device has a long life, weather **resistance**, high stability, high efficiency and is low in cost. The device is easy to manufacture and has stable physical properties at the film interface even when the **light emitting** layer consists of two or more layers.
DESCRIPTION OF DRAWING(S) - The diagram is a schematic cross-sectional view of the organic **electroluminescent** device.
Substrate 1
Hole injecting electrode 2
Negative electrode 3
Inorganic insulative hole injecting and transporting layer 4
Light emitting layer 5
Inorganic electron injecting layer 6
Dwg.1/3

FS CPI EPI
FA AB; GI
MC CPI: L04-E03
EPI: U14-J; X26-J

L37 ANSWER 23 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2000-273653 [24] WPIX
DNN N2000-205155 DNC C2000-083626
TI Organic **electroluminescent** device includes an inorganic insulating electron injecting and transporting layer comprising three oxide components.
DC L03 U12 U14 X26
IN ARAI, M; KOBORI, I; MITSUHASHI, E
PA (DENK) TDK CORP
CYC 27
PI EP 994517 A2 20000419 (200024)* EN 12p H01L051-20 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 2000123976 A 20000428 (200032) 10p H05B033-22 <--
US 6303239 B1 20011016 (200164) H01L033-00 <--
ADT EP 994517 A2 EP 1999-305041 19990625; JP 2000123976 A JP 1998-303350 19981009; US 6303239 B1 US 1999-241284 19990201
PRAI JP 1998-303350 19981009
IC ICM **H01L033-00; H01L051-20; H05B033-22**
ICS **H05B033-00; H05B033-14; H05B033-26**
AB EP 994517 A UPAB: 20000522
NOVELTY - Organic **electroluminescent** device includes an inorganic insulating electron injecting and transporting layer (6) which comprises: a first component comprising lithium oxide, rubidium oxide, potassium oxide, sodium oxide and/or caesium oxide; a second component comprising strontium oxide, magnesium oxide and/or calcium oxide; and a third component comprising silicon oxide and/or germanium oxide.
DETAILED DESCRIPTION - Organic **electroluminescent** (**EL**) device comprises a substrate (1), a hole injecting electrode (2) and a cathode (3) formed on the substrate, and an **organic layer** (5) **between** the **electrodes** and participating in at least a **light emission** function.
An inorganic insulating electron injecting and transporting layer (6) is located between the **organic layer** and the cathode. The inorganic insulating electron injecting and transporting layer comprises:

(i) a first component comprising at least one of lithium oxide, rubidium oxide, potassium oxide, sodium oxide and caesium oxide;
(ii) a second component comprising at least one of strontium oxide, magnesium oxide and calcium oxide; and
(iii) a third component comprising silicon oxide and/or germanium oxide.
USE - None given.
ADVANTAGE - Organic **EL** device has an extended life, weather **resistance**, high stability, and high efficiency and is inexpensive.
DESCRIPTION OF DRAWING(S) - The diagram shows a sectional schematic of one embodiment of the organic **electroluminescent** device.
Substrate 1
Hole injecting electrode 2
Cathode 3
Hole injecting and transporting layer 4
Light emitting layer 5
Inorganic insulating electron injecting and transporting layer 6
Dwg.1/4
FS CPI EPI
FA AB; GI
MC CPI: L03-H04A
EPI: U12-A01A1X; U14-J02; X26-J

L37 ANSWER 24 OF 73 INSPEC COPYRIGHT 2003 IEE DUPLICATE 3
AN 2001:6815663 INSPEC DN B2001-02-4260D-018
TI Surface roughness effects and their influence on the degradation of organic **light emitting** devices.
AU Jonda, Ch.; Mayer, A.B.R.; Stolz, U. (Corp. Res. & Dev., Robert Bosch GmbH, Gerlingen, Germany); Elschner, A.; Karbach, A.
SO Journal of Materials Science (15 Nov. 2000) vol.35, no.22, p.5645-51. 15 refs.
Published by: Kluwer Academic Publishers
Price: CCCC 0022-2461/2000/$15.00
CODEN: JMTSAS ISSN: 0022-2461
SICI: 0022-2461(20001115)35:22L.5645:SRET;1-O
DT Journal
TC Experimental
CY United States
LA English
AB Organic **light emitting** devices typically consist of one or several **organic** layers which are **sandwiched between** two **electrodes**, one of which has to be transparent. In most cases indium tin oxide (ITO) is employed as the transparent, hole-injecting anode material. Usually, the functional organic layers possess a thickness of about 100 nm. For such thin films the homogeneity and the surface roughness are especially important factors for the device performance. Therefore, the surface roughness of all those layers which are the basis for subsequent deposition processes were systematically studied by atomic force microscopy (AFM). For these investigations both the ITO substrate and the layers consisting of different organic materials deposited onto the ITO substrate were analyzed. In addition, the two different basic deposition methods for the organic materials, namely the deposition from solution by spin coating and the deposition by thermal evaporation, were compared to one another with respect to their resulting surface roughness. It was found that the large surface roughness of the ITO substrate induces layer inhomogeneities, especially for the vapor deposited organic layers. They can be reduced by

the incorporation of a polymeric smoothing layer.
CC B4260D Light emitting diodes; B0520X Other thin film deposition techniques; B0540 Ceramics and refractories (engineering materials science)
CT ATOMIC FORCE MICROSCOPY; CERAMICS; INDIUM COMPOUNDS; **LIGHT EMITTING** DEVICES; ORGANIC COMPOUNDS; ROUGH SURFACES; SPIN COATING; SURFACE TOPOGRAPHY
ST **organic light emitting devices degradation**; surface roughness effects; polymeric smoothing layer; transparent hole-injecting anode material; atomic force microscopy; AFM; ITO substrate; 100 nm; ITO; InSnO
CHI InSnO sur, In sur, Sn sur, O sur, InSnO ss, In ss, Sn ss, O ss
PHP size 1.0E-07 m
ET In*O*Sn; In sy 3; sy 3; O sy 3; Sn sy 3; InSnO; In cp; cp; Sn cp; O cp; In; Sn; O

L37 ANSWER 25 OF 73 INSPEC COPYRIGHT 2003 IEE
AN 2000:6633294 INSPEC DN B2000-08-4260D-009
TI Improving the performance of doped pi -conjugated polymers for use in organic **light-emitting** diodes.
AU Gross, M.; Muller, D.C. (Inst. fur Phys., Ludwig-Maximilians-Univ., Munchen, Germany); Nothofer, H.-G.; Scherf, U.; Neher, D.; Brauchle, C.; Meerholz, K.
SO Nature (8 June 2000) vol.405, no.6787, p.661-5. 21 refs.
Published by: Macmillan Magazines
Price: CCCC 0028-0836/2000/$12.00+2.00
CODEN: NATUAS ISSN: 0028-0836
SICI: 0028-0836(20000608)405:6787L.661:IPDC;1-O
DT Journal
TC Application; Experimental
CY United Kingdom
LA English
AB Organic **light-emitting** diodes (OLEDs) represent a promising technology for large, flexible, lightweight, flat-panel displays. Such devices consist of one or several semiconducting **organic** layer(s) **sandwiched between** two **electrodes**. When an electric field is applied, electrons are injected by the cathode into the lowest unoccupied molecular orbital of the adjacent molecules (simultaneously, holes are injected by the anode into the highest occupied molecular orbital). The two types of carriers migrate towards each other and a fraction of them recombine to form excitons, some of which decay radiatively to the ground state by spontaneous emission. Doped pi -conjugated polymer layers improve the injection of holes in **OLED** devices; this is thought to result from the more favourable work function of these injection layers compared with the more commonly used layer material (indium tin oxide). Here we demonstrate that by increasing the doping level of such polymers, the barrier to hole injection can be continuously reduced. The use of combinatorial devices allows us to quickly screen for the optimum doping level. We apply this concept in **OLED** devices with hole-limited **electroluminescence** (such as polyfluorene-based systems), finding that it is possible to significantly reduce the operating voltage while improving the light output and efficiency.
CC B4260D Light emitting diodes; B7260B Display materials; B2550B Semiconductor doping; B0560 Polymers and plastics (engineering materials science)
CT CONDUCTING POLYMERS; EXCITONS; LED DISPLAYS; ORGANIC SEMICONDUCTORS; SEMICONDUCTOR DOPING
ST performance; doped pi -conjugated polymers; **organic light-emitting**

 (LED)

diodes; OLEDs; flat-panel displays; semiconducting organic layer; excitons; ground state; spontaneous emission; injection of holes; work function; injection layers; doping level; barrier to hole injection; combinatorial devices; optimum doping level; **hole-limited electroluminescence**; polyfluorene-based systems; operating voltage; light output; efficiency

L37 ANSWER 26 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:753452 HCAPLUS
DN 132:7422
TI An improved electrode structure for organic **light emitting** diode **devices**
IN Jones, Gary W.; Howard, Webster E.
PA Fed Corporation, USA
SO PCT Int. Appl., 14 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01J001-62
ICS H01J001-63; H01L035-24; H01L033-00
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9960599	A1	19991125	WO 1999-US3900	19990224
	W: CN, JP, KR, US				
	RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	EP 1088320	A1	20010404	EP 1999-909560	19990224
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2002516459	T2	20020604	JP 2000-550128	19990224
	US 2002021088	A1	20020221	US 2001-919467	20010731
PRAI	US 1998-85910P	P	19980518		
	US 1998-85911P	P	19980518		
	WO 1999-US3900	W	19990224		

AB Org. **light-emitting** diode **devices** having a first electrode, a second **electrode**, and an **org.** stack **interposed between** the first **electrode** and the second electrode, the org. stack including hole transport materials located on one side and electron transport materials located on another side are described in which a thin **layer** of high work function material is interposed **between** the first **electrode** and the **org.** stack. The high work function material may be selected from the group consisting of Mo and its alloys, W and its alloys, and Nb, Zr, Co, Zn, Tc, Hf, Ta, Cr, Au, Pt, Pd, Se, and Ni or alloys contg. .gtoreq.1 of them. Org. **light-emitting** diode **devices** comprising an anode **layer** formed from a high work function material; an org. stack having hole transport materials located on one side of the stack and electron transport materials located on another side of the org. stack; a transport electrode **layer**; and a thin **layer** of a low work function material located between the org. stack and the transport **layer** are also described.
ST org **light emitting** diode electrode
IT Electric contacts
Electrodes

Electroluminescent devices
(electrode structures for org. **light-emitting** diode **devices**)

IT Chromium alloy, nonbase
Cobalt alloy, nonbase
Gold alloy, nonbase
Hafnium alloy, nonbase
Molybdenum alloy, nonbase
Nickel alloy, nonbase
Niobium alloy, nonbase
Palladium alloy, nonbase
Platinum alloy, nonbase
Selenium alloy, nonbase
Tantalum alloy, nonbase
Technetium alloy, nonbase
Tungsten alloy, nonbase
Zinc alloy, nonbase
Zirconium alloy, nonbase
RL: **DEV (Device component use)**; USES (Uses)
(electrode structures for org. **light-emitting** diode **devices**)

IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1, Niobium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-25-7, Tantalum, uses 7440-26-8, Technetium, uses 7440-33-7, Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-57-5, Gold, uses 7440-58-6, Hafnium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses **7782-49-2**, Selenium, uses
RL: **DEV (Device component use)**; USES (Uses)
(electrode structures for org. **light-emitting** diode **devices**)

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Haight; US 5714838 A 1998 HCAPLUS
(2) Hirai; US 5820996 A 1998 HCAPLUS

L37 ANSWER 27 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:582707 HCAPLUS
DN 131:191702
TI Encapsulated organic **light emitting device**
IN Haskal, Eliav; Karg, Siegfried; Salem, Jesse Richard; Scott, John Campbell
PA International Business Machines Corporation, USA
SO U.S., 6 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM H01J001-62
ICS H01J063-04
NCL 313504000
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5952778	A	19990914	US 1997-820219	19970318
	TW 424406	B	20010301	TW 1998-87103764	19980313
PRAI	US 1997-820219	A	19970318		

AB **Light-emitting devices** comprising an

org. active **layer** sandwiched **between** first and second **electrodes**, the first electrode contiguous to a transparent substrate and the second electrode contiguous to a protective covering are described in which the second electrode comprises an alkali metal, alk. earth metal, or rare earth metal and the protective covering comprises a first **layer** of gold, silver, indium, aluminum, or a transition metal directly on and in contact with the second electrode, a second **layer** of dielec. material 50-500 nm thick directly on and in contact with the first **layer** and selected from silicon nitride, silicon oxide, germanium oxide, and zirconium oxide, and a third **layer** of hydrophobic polymer directly on and in contact with the second **layer**. The second electrode may comprise calcium, lithium, or magnesium. The polymer may be a polysiloxane, polytetrafluoroethylene, or polyolefin. The protective covering may further comprises an impact-resistant fourth **layer** of glass or metal.

ST encapsulated org **light emitting device**

IT **Electroluminescent devices**
Electronic packaging materials
(**multilayer** systems for encapsulating org. **light-emitting devices**)

IT Alkali metals, uses
Alkaline earth metals
Fluoropolymers, uses
Glass, uses
Polyolefins
Polysiloxanes, uses
Rare earth metals, uses
Transition metals, uses
RL: **DEV (Device component use)**; USES (Uses)
(**multilayer** systems for encapsulating org. **light-emitting devices**)

IT 7439-95-4, Magnesium, uses
RL: **DEV (Device component use)**; USES (Uses)
(**electrode; multilayer** systems for encapsulating org. **light-emitting devices**)

IT 147-14-8, Copper phthalocyanine 1310-53-8, Germanium oxide, uses 1314-23-4, Zirconium oxide, uses 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 7429-90-5, Aluminum, uses **7439-93-2**, Lithium, uses 7440-22-4, Silver, uses 7440-57-5, Gold, uses **7440-70-2**, Calcium, uses 7440-74-6, Indium, uses **7631-86-9**, Silicon oxide, uses 9002-84-0, Polytetrafluoroethylene **12033-89-5**, Silicon nitride, uses 113443-18-8, Silicon monoxide 117665-21-1 138184-36-8, MEH-PPV
RL: **DEV (Device component use)**; USES (Uses)
(**multilayer** systems for encapsulating org. **light-emitting devices**)

RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Benjamin; US 4983310 1991 HCAPLUS
(2) Farng; US 5169547 1992 HCAPLUS
(3) Friend; US 5247190 1993
(4) Harvey; US 5757126 1998 HCAPLUS
(5) Harvey; US 5771562 1998 HCAPLUS
(6) Hashimoto; US 5214306 1993 HCAPLUS
(7) Hegger; US 5408109 1995 HCAPLUS
(8) Holm; US 5449926 1995
(9) Karol; US 5391756 1995 HCAPLUS

(10) Kido, J; Cecri 1994, P1 HCAPLUS
(11) Konishikawa; US 5337374 1994
(12) Leventis; US 5189549 1993 HCAPLUS
(13) Ogata; US 5296724 1994
(14) Okorodudu; US 5362410 1994 HCAPLUS
(15) Ozawa; US 5373175 1994 HCAPLUS
(16) Pei, Q; Science 1995, V269, P1086 HCAPLUS
(17) Reamey; US 5328580 1994 HCAPLUS
(18) Shi; US 5593788 1997 HCAPLUS
(19) Shi; US 5811177 1998
(20) Tang; US 4356429 1982 HCAPLUS
(21) VanSlyke; US 4539507 1985
(22) Yamashita; US 5124204 1992

L37 ANSWER 28 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:756257 HCAPLUS
DN 132:17194
TI Organic **EL** displays and their manufacture
IN Kodama, Mitsufumi; Nakatani, Kenji
PA TDK Electronics Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 16 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H05B033-26
ICS H05B033-10; H05B033-12; H05B033-14; H05B033-22
CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
Section cross-reference(s): 73
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 11329749	A2	19991130	JP 1998-146624	19980512
PRAI	JP 1998-146624		19980512		

AB The **device** comprises a substrate having a 1st electrode, .gtoreq.2 org. **layers** having **light-emitting** effect, and a 2nd electrode in the order, with elec. floating internal **electrode** formed in **between** the **org. layers**. **EL** displays are manufd. by formation of a 1st electrode on a substrate, formation of an insulator, formation of an electrode structure having a over-hanged part and an elec. conducting base part, formation of .gtoreq.2 **org. light-emitting layers** with in-**between** floating **electrode**, and formation of a 2nd electrode. Color displays showing high brightness are obtained with less wirings.

ST org **EL** display floating electrode

IT **Electroluminescent devices**
(manuf. of org. **EL** displays with floating **electrodes** in **between org. EL layers**)

IT Glass, uses
RL: **DEV (Device component use)**; USES (Uses)
(spin-on-glass, insulation **layer** in; manuf. of org. **EL** displays with floating **electrodes** in **between org. EL layers**)

IT 2085-33-8, Tris(8-hydroxyquinoline)aluminum 158605-06-2
RL: **DEV (Device component use)**; USES (Uses)
(**EL layer**; manuf. of org. **EL** displays with floating **electrodes** in **between org.**

EL layers)

IT 7429-90-5, Aluminum, uses 7440-47-3, Chromium, uses 12614-86-7
143010-15-5, Magnesium 91, silver 9
RL: **DEV (Device component use)**; USES (Uses)
(electrode; manuf. of org. **EL** displays with floating **electrodes** in **between org. EL layers**)

IT 50926-11-9, ITO
RL: **DEV (Device component use)**; USES (Uses)
(floating electrode; manuf. of org. **EL** displays with floating **electrodes** in **between org. EL layers**)

IT **7631-86-9**, Silica, uses
RL: **DEV (Device component use)**; USES (Uses)
(insulation **layer** in; manuf. of org. **EL** displays with floating **electrodes** in **between org. EL layers**)

L37 ANSWER 29 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:708080 HCAPLUS
DN 131:315650
TI Organic **EL** (**electroluminescent**) **device** showing improved heat and weather resistance
IN Arai, Sachio
PA TDK Electronics Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM H05B033-22
ICS C09K011-00; C09K011-06; H05B033-14; H05B033-26
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 11307267	A2	19991105	JP 1998-122975	19980416
PRAI	JP 1998-122975		19980416		

AB In the **EL device** comprising a substrate, a pair of electrodes, and .gtoreq.1 **light-emitting org** . **layer between** the **electrodes**; elec. insulating **layers** are arranged between the org. **layer** and both the electrode. The insulating **layers** works as elec. capacitors and generate dielec. polarization upon application of a voltage to the **device**, leading to recombination of electrons and holes, so that the **EL device** inhibits leak current and dark spot generation and shows improved heat and weather resistance without a hole-injection **layer** and an electron-injection **layer**.

ST org **EL device** insulator **layer**; **electroluminescent** org **device** dielec capacitor **layer**

IT Electric insulators
Electroluminescent devices
(**org. EL device** having dielec. **layers between org. layer** and **electrodes** showing improved heat and weather resistance)

IT 1304-28-5, Barium oxide, uses 1305-78-8, Calcia, uses 1313-96-8, Niobium oxide 1314-11-0, Strontium oxide, uses 1314-23-4, Zirconia,

uses 1314-61-0, Tantalum oxide 1335-25-7, Lead oxide **1344-28-1**, Alumina, uses **7631-86-9**, Silica, uses **12033-89-5**, Silicon nitride (si3n4), uses 12055-23-1, Hafnium oxide **12057-24-8**, Lithium oxide, uses **13463-67-7**, Titania, uses
RL: **DEV (Device component use)**; USES (Uses)
(elec. insulator; **org. EL device** having dielec. **layers between org. layer** and **electrodes** showing improved heat and weather resistance)

L37 ANSWER 30 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 1999:426975 HCAPLUS
DN 131:80832
TI Light-transmitting, reflection-type, and **electroluminescent** display **device**
IN Yamazae, Hiroshi; Wakita, Naohide; Yamanaka, Yasuhiko; Ezawa, Takeshi; Kawaguri, Mariko
PA Matsushita Electric Industrial Co., Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 8 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM G02F001-136
ICS G02F001-1345
CC 74-12 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 11183935	A2	19990709	JP 1997-352613	19971222
PRAI JP 1997-352613		19971222		

AB The **device** has a (reflection-type) pixel electrode and a Si-integrated chip formed on a **multilayer** wiring on an insulating substrate and a liq. crystal **layer** between the electrode and counter substrates, in which the chip is elec. contacted to the electrode via the wiring. The **device** has a pixel electrode and a Si-integrated chip formed on a **multilayer** wiring on an insulating substrate and an **org.** elec.-field **light-emitting layer between** counter **electrodes**, in which the chip is elec. contacted to the electrode via the wiring. The **device** gives good images with high contrast.
ST light transmitting liq crystal display **device**; reflection type liq crystal display **device**; **electroluminescent** type liq crystal display
IT Liquid crystal displays
(liq. crystal display **device** with high contrast)
IT **7440-21-3**, Silicon, uses
RL: **DEV (Device component use)**; USES (Uses)
(liq. crystal display **device** with high contrast)

L37 ANSWER 31 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 1999-280493 [24] WPIX
DNN N1999-210367 DNC C1999-082613
TI Sputter deposition method for the manufacture of organic **light emitting** device.
DC A26 A35 A85 L03 M13 U11 U12
IN CARTER, J; HEEKS, S K

PA (CAMB-N) CAMBRIDGE DISPLAY TECHNOLOGY LTD
CYC 82
PI GB 2331765 A 19990602 (199924)* 16p C23C014-20
WO 9928521 A1 19990610 (199930) EN C23C014-20
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG ZW
W: AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE GH GM HR HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG US UZ VN YU ZW
AU 9911687 A 19990616 (199945) C23C014-20
ADT GB 2331765 A GB 1997-25434 19971201; WO 9928521 A1 WO 1998-GB3489 19981120; AU 9911687 A AU 1999-11687 19981120
FDT AU 9911687 A Based on WO 9928521
PRAI GB 1997-25434 19971201
IC ICM C23C014-20
ICS **H01L033-00; H01L051-20; H05B033-14**
AB GB 2331765 A UPAB: 19990624
NOVELTY - Sputter deposition on to an organic material comprises using a discharge gas with a spectrum of **light emission** of a lower energy than that of argon.
DETAILED DESCRIPTION - INDEPENDENT CLAIMs are also included for: (1) the manufacture of an organic **light emitting** device comprising forming a first electrode, providing an **organic light emissive layer** adjacent the first electrode, and sputter depositing a second electrode on the previous layer by a sputtering process in which neon is used as the discharge gas; and (2) for an organic **light emitting** device.
USE - Sputter deposition method for the manufacture of organic **light emitting** device.
ADVANTAGE - After the sputter deposition is complete, less damage to the **organic layer** is obtained compared to a process using argon. The rectification ratio of an organic **light emitting** device having a cathode which is sputter deposited using neon as the discharge gas is typically 100 times better than that of a device having a cathode sputter deposited using argon. Sputtering directly on to sensitive soluble **organic layers** such as MEH-PPV is feasible with neon as the discharge gas.
FS CPI EPI
FA AB
MC CPI: A05-J; A11-C04B; A12-E11; L03-C04; L03-D01D; L03-G05; M13-G01
EPI: U11-C01A3; U11-C01J5; U12-A01A1X; U12-A01A2

L37 ANSWER 32 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 2000-064722 [06] WPIX
CR 2000-064721 [06]
DNN N2000-050778 DNC C2000-018225
TI Inorganic-organic junction structure in an organic **electroluminescent** device.
DC L03 U14 X26
IN ARAI, M; KOBORI, I; MITSUHASHI, E
PA (DENK) TDK CORP
CYC 26
PI EP 967669 A2 19991229 (200006)* EN 12p H01L051-20 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
US 6200695 B1 20010313 (200120) H05B033-13 <--
ADT EP 967669 A2 EP 1999-305045 19990625; US 6200695 B1 US 1998-207660

19981209
PRAI JP 1998-347946 19981120; JP 1998-196727 19980626
IC ICM **H01L051-20; H05B033-13**
AB EP 967669 A UPAB: 20010410
NOVELTY - An organic **electroluminescent** device comprises an inorganic insulating hole injecting layer (4) between the hole injecting electrode (2) and at least one **organic layer**, it consists of silicon oxide or germanium oxide or a mixture of silicon oxide and germanium oxide and has an average composition represented by the formula:
(Si1-xGex)Oy where x is 0-1, y is 1.7-1.99 as analyzed by Rutherford back-scattering.
DETAILED DESCRIPTION - An organic **electroluminescent** device comprises a hole injecting electrode (2), an electron injecting electrode (3), at least one **organic layer between** the **electrodes**, and an inorganic insulating hole injecting layer (4) between the hole injecting electrode and the at least one **organic layer**. The inorganic insulating hole injecting layer consists of silicon oxide or germanium oxide or a mixture of silicon oxide and germanium oxide and has an average composition represented by the formula:
(Si1-xGex)Oy where x is 0-1, y is 1.7-1.99 as analyzed by Rutherford back-scattering.
USE - Organic **electroluminescent** device, particularly an inorganic/organic junction structure.
ADVANTAGE - The organic **electroluminescent** device has heat **resistance**, an extended effective life, an improved efficiency, a low drive voltage and a low cost.
DESCRIPTION OF DRAWING(S) - The drawing shows the configuration of an organic **electroluminescent** device of the invention.
Substrate 1
Hole injecting electrode 2
Electron injecting electrode 3
Inorganic insulating hole injecting layer 4
Light emitting layer 5
Dwg.1/4
FS CPI EPI
FA AB; GI
MC CPI: L03-C04
EPI: U14-J; X26-J

L37 ANSWER 33 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 1999-280163 [24] WPIX
DNN N1999-210155 DNC C1999-082509
TI Organic **electroluminescent** device.
DC L03 U11 U14 X26
IN KIM, S T; KIM, S
PA (GLDS) LG ELECTRONICS INC; (GLDS) KINSEISHA KK
CYC 29
PI EP 917410 A1 19990519 (199927)* EN 10p H05B033-10 <--
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
JP 11111465 A 19990423 (199927) 5p H05B033-22 <--
CN 1211829 A 19990324 (199931) H01L051-00 <--
KR 99025797 A 19990406 (200025) H01L033-00 <--
US 6099746 A 20000808 (200040) B05D005-12
KR 244185 B1 20000201 (200118) H01L033-00 <--
ADT EP 917410 A1 EP 1998-303389 19980430; JP 11111465 A JP 1998-197821 19980713; CN 1211829 A CN 1998-108714 19980529; KR 99025797 A KR

1997-47579 19970918; US 6099746 A US 1998-58293 19980410; KR 244185 B1 KR 1997-47579 19970918

PRAI KR 1997-47579 19970918

IC ICM B05D005-12; **H01L033-00**; **H01L051-00**; **H05B033-10**; **H05B033-22**
ICS B05D005-06; **H05B033-02**; **H05B033-14**

AB EP 917410 A UPAB: 19990719
NOVELTY - Organic **electroluminescent** device includes insulating partition walls (13) of trapezoidal shape for isolating adjacent pixels.
DETAILED DESCRIPTION - An **electroluminescent** device has pixels formed of first (12) and second **electrode** (15) stripes **sandwiching** an **organic EL layer**. An insulating partition wall projects from the first electrode stripe, the wall having a trapezoidal structure with a lower side wider than the upper side. Portions of the second electrode, and possibly the **EL multilayer** (14), formed on the top of the wall are etched out and any two adjacent pixels are electrically isolated. The partition wall is preferably formed of photoresist, silicon nitride or silicon oxide.
USE - Especially as a flat panel display device.
ADVANTAGE - Adequate pixellation is achieved using simple, stable partition walls which are easily fabricated.
DESCRIPTION OF DRAWING(S) - The drawing shows the organic **EL** device of the invention
Transparent substrate 11
First electrode stripes 12
Partition walls 13
Organic EL layer 14
Second electrode stripes 15
Dwg.2e/2

FS CPI EPI
FA AB; GI
MC CPI: L03-C04
EPI: U11-C08; U14-J; X26-J

L37 ANSWER 34 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 1999-314914 [27] WPIX
DNN N1999-235369 DNC C1999-093158
TI Long lifetime organic **electroluminescent** devices.
DC E11 E12 L03 U12 U14 X26
IN KIM, M S; KIM, S T; OH, H Y; YOON, J G
PA (GLDS) LG ELECTRONICS CO LTD; (GLDS) LG ELECTRONICS INC; (GLDS) KINSEISHA KK
CYC 29

PI	EP 917216	A2	19990519 (199927)*	EN 116p	H01L051-20	<--
	R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI					
	CN 1217582	A	19990526 (199939)		H01L033-00	<--
	JP 11233263	A	19990827 (199945)	17p	H05B033-22	<--
	KR 99044817	A	19990625 (200036)		H01L033-00	<--
	US 6248458	B1	20010619 (200137)		H05B033-12	<--
	KR 2001021486	A	20010315 (200159)#		C09K011-00	
	US 2001031380	A1	20011018 (200166)		H05B033-12	<=
	KR 313912	B	20011116 (200240)#		C09K011-00	
	KR 320455	B	20020219 (200257)		C09K011-00	

ADT EP 917216 A2 EP 1998-306710 19980821; CN 1217582 A CN 1998-116616 19980728; JP 11233263 A JP 1998-319631 19981110; KR 99044817 A KR 1998-37215 19980909; US 6248458 B1 US 1998-178515 19981026; KR 2001021486 A Div ex KR 1998-37215 19980909, KR 2000-71522 20001129; US 2001031380 A1

Cont of US 1998-178515 19981026, US 2001-848282 20010504; KR 313912 B Div ex KR 1998-37215 19980909, KR 2000-71522 20001129; KR 320455 B KR 1998-37215 19980909
FDT US 2001031380 A1 Cont of US 6248458; KR 313912 B Previous Publ. KR 2001021486; KR 320455 B Previous Publ. KR 99044817
PRAI KR 1998-18193 19980520; KR 1997-60534 19971117; KR 2000-71522 20001129
IC ICM C09K011-00; **H01L033-00; H01L051-20; H05B033-12; H05B033-22**
ICS C09K011-06
AB EP 917216 A UPAB: 19990714
NOVELTY - An organic **electroluminescent** (**EL**) device including at least one **organic EL layer** **between** first and second **electrodes** comprises a layer formed of at least one porphyrinic compound.
USE - As an organic **light-emitting** diode in a flat-panel display device.
ADVANTAGE - The devices have a long lifetime, e.g. 100 hours to greater than 2,000 hours, and high efficiency. The porphyrin enhances adhesion of the organic/metal interface, making contact with the second electrode through open spaces in the thin, metal-containing layer, and extends the lifetime. Both the lifetime and the electron-injecting capability are increased by using a **mixed layer** of the porphyrin and metal-containing materials between the **light-emitting** layer and the cathode.
FS CPI EPI
FA AB; GI; DCN
MC CPI: L03-C04; L03-D01D
EPI: U12-A01A1X; U14-J; X26-J

L37 ANSWER 35 OF 73 INSPEC COPYRIGHT 2003 FIZ KARLSRUHE
AN 1999:6351073 INSPEC DN B1999-10-4260D-072
TI Improvement of metal-organic interface by insertion of mono-layer size insulating layer in organic **EL** device.
AU Kurosaka, Y.; Tada, N.; Ohmori, Y.; Yoshino, K. (Dept. of Electron. Eng., Osaka Univ., Japan)
SO Synthetic Metals (June 1999) vol.102, no.1-3, p.1101-2. 2 refs.
Doc. No.: S0379-6779(98)01386-1
Published by: Elsevier
Price: CCCC 0379-6779/99/$20.00
CODEN: SYMEDZ ISSN: 0379-6779
SICI: 0379-6779(199906)102:1/3L.1101:IMOI;1-S
Conference: International Conference on Science and Technology of Synthetic Metals. Montpellier, France, 12-18 July 1998
DT Conference Article; Journal
TC Practical; Experimental
CY Switzerland
LA English
AB Insertion of mono-layer size insulating layer into the cathode/organic and anode/organic layer has been investigated in an organic **EL** device, which consists of 8-hydroxyquinoline aluminum (Alq,) as an emissive layer and diamine (TPD) as a hole transporting layer. The emission characteristics have been improved by insertion of mono-layer size of Al2O3 **between electrode** and **organic** layers, and the dependence of layer thickness of Al2O3 has been investigated.
CC B4260D Light emitting diodes; B4220 Luminescent materials; B2810 Dielectric materials and properties

CT ALUMINA; **ELECTROLUMINESCENCE**; INSULATING THIN FILMS; **LIGHT EMITTING** DIODES; MONOLAYERS; ORGANIC COMPOUNDS; ORGANOMETALLIC COMPOUNDS
ST metal-organic interface; mono-layer size insulating layer; **organic EL device**; cathode/organic layer; anode/organic layer; 8-hydroxyquinoline aluminum; emissive layer; diamine; hole transporting layer; emission characteristics; Al2O3; layer thickness
CHI Al2O3 int, Al2 int, Al int, O3 int, O int, Al2O3 bin, Al2 bin, Al bin, O3 bin, O bin
ET Al*O; Al2O3; Al cp; cp; O cp; Al2O; Al; O

L37 ANSWER 36 OF 73 HCAPLUS COPYRIGHT 2003 ACS DUPLICATE 4
AN 1999:141732 HCAPLUS
DN 130:303742
TI Organic-inorganic **multilayer** structures: a novel route to highly efficient organic **light-emitting** diodes
AU Riess, Walter; Riel, Heike; Seidler, Paul F.; Vestweber, Horst
CS Zurich Research Laboratory, IBM Research Division, Rueschlikon, CH-8803, Switz.
SO Synthetic Metals (1999), 99(3), 213-218
CODEN: SYMEDZ; ISSN: 0379-6779
PB Elsevier Science S.A.
DT Journal
LA English
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
AB A novel **device** structure for org. **light-emitting** diodes (OLEDs) is described, which consists in the most general case of an alternating sequence of thin inorg. and **org. layers sandwiched between** 2 **electrodes**. Compared to conventional OLEDs, these **devices** have a significantly enhanced current flow, increased brightness, and higher luminous efficiency at a given voltage. These improvements in performance can be attributed to increased and more balanced charge-carrier injection as well as charge-carrier confinement effects, which together lead to higher radiative recombination probability.
ST LED org inorg **multilayer** carrier injection radiative recombination; ITO LED **multilayer** carrier injection radiative recombination; calcium LED **multilayer** carrier injection radiative recombination; magnesium LED **multilayer** carrier injection radiative recombination; silver LED **multilayer** carrier injection radiative recombination; silica LED **multilayer** carrier injection radiative recombination; alumina LED **multilayer** carrier injection radiative recombination; calcia LED **multilayer** carrier injection radiative recombination; rubrene LED **multilayer** carrier injection radiative recombination; hydroxyquinoline aluminum LED **multilayer** carrier injection radiative recombination; copper phthalocyanine LED **multilayer** carrier injection radiative recombination; lithium fluoride LED **multilayer** carrier injection radiative recombination; current voltage LED **multilayer** carrier injection radiative recombination
IT Electric current carriers
(injection; org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)
IT Electric current-potential relationship

Electroluminescent devices
Radiative recombination
(org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)

IT 50926-11-9, ITO
RL: **DEV (Device component use)**; USES (Uses)
(anode; org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)

IT 147-14-8, Copper phthalocyanine
RL: **DEV (Device component use)**; USES (Uses)
(buffer-injection **layer**; org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)

IT 7439-95-4, Magnesium, uses **7440-70-2**, Calcium, uses
RL: **DEV (Device component use)**; USES (Uses)
(cathode; org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)

IT 7440-22-4, Silver, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(cathode; org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)

IT 1305-78-8, Calcia, uses **7631-86-9**, Silica, uses **7789-24-4**, Lithium fluoride, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(inorg. ultrathin film; org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)

IT 2085-33-8, Hydroxyquinoline aluminum 123847-85-8
RL: **DEV (Device component use)**; USES (Uses)
(org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)

IT 517-51-1, Rubrene **1344-28-1**, Alumina, uses 7429-90-5, Aluminum, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use); USES (Uses)
(org.-inorg. **multilayer** structures with novel route to highly efficient org. **light-emitting** diodes by radiative recombination enhancement through carrier injection and confinement)

RE.CNT 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L37 ANSWER 37 OF 73 INSPEC COPYRIGHT 2003 IEE
AN 1999:6305721 INSPEC DN B1999-09-4260D-008
TI Organic **light-emitting** diodes and their stability.
AU Zhou Xiang; Hou Xiaoyuan (Surface Phys. Lab., Fudan Univ., Shanghai, China)
SO Wuli (April 1999) vol.28, no.4, p.201-6. 16 refs.
Published by: Science Press
CODEN: WULIAL ISSN: 0379-4148
SICI: 0379-4148(199904)28:4L.201:OLED;1-W
DT Journal
TC Experimental
CY China
LA Chinese
AB Organic **light-emitting** diodes (OLEDs) are ready for commercialization. However their stability is still a key issue. A brief review is given of OLEDs and their stability, focusing mainly on the degradation process, effects of water and oxygen, inter-reactions **between electrodes** and **organic** materials, and the thermal stability of the organic materials.
CC B4260D Light emitting diodes
CT **LIGHT EMITTING** DIODES; ORGANIC COMPOUNDS; THERMAL STABILITY
ST **organic light-emitting diodes; OLED;** commercialization; degradation process; water effects; O effects; electrodes-organic materials interreactions; thermal stability; organic LED; H2O; O2
CHI H2O bin, H2 bin, H bin, O bin; O2 el, O el
ET O; H*O; H2O; H cp; cp; O cp; O2; H

L37 ANSWER 38 OF 73 COMPENDEX COPYRIGHT 2003 EEI
AN 1999(49):3518 COMPENDEX
TI Improvement of metal-organic interface by insertion of mono-layer size insulating layer in organic **EL** device.
AU Kurosaka, Y. (Osaka Univ, Osaka, Jpn); Tada, N.; Ohmori, Y.; Yoshino, K.
MT Proceedings of the 1999 International Conference on Science and Technology of Synthetic Metals (ICSM-98).
MO Ministere de l'Education Nationale; Universite de Montpellier II; Conseil Regional du Languedoc-Roussillon; District de Montpellier; et al.
ML Montpellier
MD 12 Jul 1998-18 Jul 1998
SO Synthetic Metals v 102 n 1-3 pt 2 Jun 1999.p 1101-1102
CODEN: SYMEDZ ISSN: 0379-6779
PY 1999
MN 55266
DT Journal
TC Experimental
LA English
AB Insertion of mono-layer size insulating layer into the cathode/organic and anode/organic layer has been investigated in organic **EL** device, which consists of 8-hydroxyquinoline aluminum (Alq3) as an emissive layer and diamine (TPD) as a hole transporting layer. The emission characteristics have been improved by insertion of mono-layer size of Al2O3 **between electrode** and **organic** layers, and the dependence of layer thickness of Al2O3 has been investigated.(Author abstract) 2 Refs.
CC 714.2 Semiconductor Devices and Integrated Circuits; 804.1 Organic Components; 701.1 Electricity: Basic Concepts and Phenomena; 741.1 Light. Optics; 931.2 Physical Properties of Gases, Liquids and Solids; 712.1.2 Compound Semiconducting Materials
CT ***Light emitting** diodes; Alumina; Interfaces (materials); Light sources; Morphology; Current voltage characteristics; Semiconducting indium compounds; Aluminum compounds; Amines; **Electroluminescence**
ST Hydroxyquinoline aluminum; Diamine; Hole transporting layer
ET Al*O; Al2O3; Al cp; cp; O cp

L37 ANSWER 39 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:176122 HCAPLUS
DN 128:237067
TI Electrode deposition for organic **light-emitting devices**
IN Pichler, Karl; Devine, Peter
PA Cambridge Display Technology Limited, UK; Pichler, Karl; Devine, Peter
SO PCT Int. Appl., 50 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H01L033-00
ICS H05B033-26; H05B033-10
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75, 76
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9810473	A1	19980312	WO 1997-GB2395	19970904

W: CN, GB, JP, US
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE

GB	2332094	A1	19990609	GB 1999-4764	19970904
EP	946993	A1	19991006	EP 1997-939049	19970904
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
JP	2000517469	T2	20001226	JP 1998-512367	19970904
US	6402579	B1	20020611	US 1999-254302	19991223
US	2002109458	A1	20020815	US 2002-81849	20020225
US	6488555	B2	20021203		
PRAI GB	1996-18473	A	19960904		
GB	1996-18474	A	19960904		
GB	1996-18475	A	19960904		
GB	1997-12295	A	19970612		
WO	1997-GB2395	W	19970904		
US	1999-254302	A1	19991223		

AB Org. **light-emitting devices** having at least one **layer** of **light-emitting org.** material arranged **between** first and second **electrodes** are described in which .gtoreq.1 of first and second **electrodes** has a **multilayer** structure, each **layer** of the **multilayer** structure being a d.c. magnetron sputtered **layer**. Org. **light-emitting devices** having two or more **layers** of **light-emitting org.** material arranged **between** first and second **electrodes** are also described in which an uppermost **layer** of the org. material being more resistant to sputter deposition than an underlying **layer** of the org. material, and the electrode formed over the uppermost **layer** of org. material being a sputtered **layer**. Methods for making the structures are also described.

ST sputtered electrode org **light emitting device**

IT Electric contacts
Electrodes
Electroluminescent devices
Semiconductor **device** fabrication
Sputtering
(org. **light-emitting devices** with sputtered **electrodes**)

IT Osmium alloy
Rhenium alloy
Tellurium alloy
antimony alloy
arsenic alloy
barium alloy
calcium alloy
carbon alloy
cerium alloy
cesium alloy
cobalt alloy
copper alloy
europium alloy
germanium alloy
gold alloy
indium alloy
lead alloy
lithium alloy
magnesium alloy
manganese alloy

nickel alloy
palladium alloy
platinum alloy
potassium alloy
rubidium alloy
ruthenium alloy
samarium alloy
selenium alloy
silicon alloy
silver alloy
sodium alloy
strontium alloy
terbium alloy
tin alloy
titanium alloy
tungsten alloy
ytterbium alloy
zinc alloy
zirconium alloy
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(org. **light-emitting devices** with sputtered **electrodes**)

IT **1314-13-2**, Zinc oxide, uses 1332-29-2, Tin oxide 7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-02-0D, Nickel, intermetallic compds., uses 7440-04-2, Osmium, uses 7440-04-2D, Osmium, intermetallic compds., uses 7440-05-3, Palladium, uses 7440-05-3D, Palladium, intermetallic compds., uses 7440-06-4, Platinum, uses 7440-06-4D, Platinum, intermetallic compds., uses 7440-15-5, Rhenium, uses 7440-15-5D, Rhenium, intermetallic compds., uses 7440-18-8, Ruthenium, uses 7440-18-8D, Ruthenium, intermetallic compds., uses 7440-22-4, Silver, uses 7440-22-4D, Silver, intermetallic compds., uses 7440-38-2, Arsenic, uses 7440-38-2D, Arsenic, intermetallic compds., uses 7440-44-0, Carbon, uses 7440-48-4, Cobalt, uses 7440-48-4D, Cobalt, intermetallic compds., uses **7440-56-4**, Germanium, uses **7440-56-4D**, Germanium, intermetallic compds., uses 7440-57-5, Gold, uses 7440-57-5D, Gold, intermetallic compds., uses **7782-49-2**, Selenium, uses **7782-49-2D**, Selenium, intermetallic compds., uses 11099-19-7 11099-22-2 13494-80-9, Tellurium, uses 13494-80-9D, Tellurium, intermetallic compds., uses 50926-11-9, Indium tin oxide 96638-49-2, Poly(phenylene vinylene) 138184-36-8, Poly(2-methoxy,5-(2'-ethyl-hexyloxy)-p-phenylene vinylene)
RL: **DEV (Device component use)**; PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(org. **light-emitting devices** with sputtered **electrodes**)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Bulovic, V; APPLIED PHYSICS LETTERS 1997, V70(22), P2954 HCAPLUS
(2) Eastman Kodak Co; EP 0468437 A 1992 HCAPLUS
(3) Friend, R; US 5247190 A 1993
(4) Holmes, A; WO 9403031 A 1994 HCAPLUS
(5) Sumitomo Chemical Co; EP 0443861 A 1991 HCAPLUS
(6) Suzuki, H; APPLIED PHYSICS LETTERS 1996, V68(16), P2276 HCAPLUS
(7) Yoshikawa, M; US 5006915 A 1991 HCAPLUS

L37 ANSWER 40 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:365162 HCAPLUS

DN 129:60379
TI Organic **electroluminescent device**
IN Hosokawa, Chishio; Matsuura, Masahide; Tokailin, Hiroshi
PA Idemitsu Kosan Company Limited, Japan
SO Eur. Pat. Appl., 26 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM H05B033-28
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 845924	A2	19980603	EP 1997-120854	19971127
	EP 845924	A3	19990120		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 10162959	A2	19980619	JP 1996-319567	19961129
	JP 10294182	A2	19981104	JP 1997-101570	19970418
	EP 1119221	A2	20010725	EP 2001-109489	19971127
	EP 1119221	A3	20020918		
	R: BE, CH, DE, FR, GB, IT, LI, NL, SE				
	EP 1119222	A2	20010725	EP 2001-109490	19971127
	EP 1119222	A3	20020918		
	R: BE, CH, DE, FR, GB, IT, LI, NL, SE				
	US 6284393	B1	20010904	US 1997-980345	19971128
PRAI	JP 1996-319567	A	19961129		
	JP 1997-101570	A	19970418		
	EP 1997-120854	A3	19971127		

AB Org. **electroluminescent devices** comprising a pos. electrode, a neg. electrode, and an org. **layer** including an **org. light-emitting layer** as **sandwiched between** the two **electrodes** are described in which the neg. electrode comprises an electron injection electrode **layer** and an amorphous transparent conductive film, and the electron injection electrode **layer** is adjacent to the org. **layer**, or in which the neg. electrode compriseds an electron injection electrode **layer**, a transparent conductive film, and a thin metal film having a specific resistance of not larger than 1 x 10-5 .OMEGA..cntdot.cm, as laminated in that order with the electron injection electrode **layer** being adjacent to the org. **layer**, and a thin transparent film is formed outside the neg. electrode. Preferably, the transparent conductive film is amorphous. The **devices** have a neg. electrode with low resistance and high transparency, and have high luminous efficiency and good durability (wet heat resistance). Light can be taken out through the side of the neg. electrode of the **devices**.

ST org **electroluminescent device** neg electrode structure
IT Transparent films
(elec. conductive, films; **electroluminescent device** neg. electrode structures)
IT Anodes
Electroluminescent devices
(**electroluminescent device** neg. electrode structures)
IT Electric conductors

(films, transparent, films; **electroluminescent device** neg. electrode structures)

IT Electric contacts
Electrodes
(transparent; **electroluminescent device** neg. electrode structures)

IT 147-14-8, Copper phthalocyanine 2085-33-8, Tris(8-hydroxyquinolinato)aluminum 7439-95-4, Magnesium, uses 7440-22-4, Silver, uses **13463-67-7**, Titania, uses 50926-11-9, Indium tin oxide 65181-78-4, N,N'-Diphenyl-N,N'-bis(3-methylphenyl)-1,1'-biphenyl-4,4'-diamine 117944-65-7, Indium zinc oxide
RL: **DEV (Device component use)**; USES (Uses)
(**electroluminescent device** neg. electrode structures)

L37 ANSWER 41 OF 73 INSPEC COPYRIGHT 2003 IEE
AN 1998:5914562 INSPEC DN B9806-7260-113
TI See-through, multi-pixel organic emissive display.
AU Yap, D. (HRL, Malibu, CA, USA)
SO Electronics Letters (30 April 1998) vol.34, no.9, p.915-16. 3 refs.
Published by: IEE
Price: CCCC 0013-5194/98/$10.00
CODEN: ELLEAK ISSN: 0013-5194
SICI: 0013-5194(19980430)34:9L.915:TMPO;1-R
DT Journal
TC Experimental
CY United Kingdom
LA English
AB A see-through multi-pixel emissive display has been demonstrated. The 8*12 pixel display, fabricated on a glass substrate, has two partially transparent **electrodes** that **sandwich** multi-layer, thin film **organic** materials. The fabrication approach is based on common integrated circuit processing techniques and can be extended to form active matrix addressed displays on silicon substrates.
CC B7260 Display technology and systems; B4260 Electroluminescent devices
CT **ELECTROLUMINESCENT** DISPLAYS; ORGANIC COMPOUNDS; TRANSPARENCY
ST see-through multi-pixel emissive display; glass substrate; partially transparent electrode; sandwich multilayer thin film organic material; fabrication; integrated circuit processing; active matrix addressing; silicon substrate; 8 pixel; 12 pixel
PHP picture size 8.0E+00 pixel; picture size 1.2E+01 pixel

L37 ANSWER 42 OF 73 HCAPLUS COPYRIGHT 2003 ACS DUPLICATE 5
AN 1999:37535 HCAPLUS
DN 130:188741
TI Improvement of electrode-organic interface by insertion of monolayer size Al2O3 **layer** in organic **EL device**
AU Ohmori, Yutaka; Kurosaka, Yoshitaka; Tada, Norio; Sawatani, Takumi; Ueta, Hiroshi; Yoshino, Katsumi
CS Department of Electronic Engineering, Osaka University, Suita, 565-0871, Japan
SO Molecular Crystals and Liquid Crystals Science and Technology, Section A: Molecular Crystals and Liquid Crystals (1998), 322, 263-270
CODEN: MCLCE9; ISSN: 1058-725X
PB Gordon & Breach Science Publishers
DT Journal
LA English
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related

Properties)
Section cross-reference(s): 76

AB Improvement of electrode/org. interface was studied in org. **electroluminescent** diode which consists of 8-hydroxyquinoline aluminum and diamine deriv. An aluminum oxide (Al2O3) monolayer inserted **between electrode** and **org.** interface was studied. Emission efficiency was increased by inserting monolayer size of Al2O3 between anode and org. **layer** and between cathode and org. **layer.** The mechanism of improvement in emission efficiency is discussed.

ST alumina nanometer thin film **electroluminescence** org **light emitting** diode; electrode coating aluminum oxide **electroluminescent device**

IT **Electrodes**
(alumina coating; **electroluminescent device** with alumina thin films **between electrodes** and **org. layers**)

IT Electric current-potential relationship
Interface
Ultrathin films
(**electroluminescent device** with alumina thin films **between electrodes** and **org. layers**)

IT **Electroluminescent devices**
(with alumina thin films **between electrodes** and **org. layers**)

IT 50926-11-9, Indium tin oxide
RL: **DEV (Device component use)**; USES (Uses)
(anode; **electroluminescent device** with alumina thin films **between electrodes** and **org. layers**)

IT 7429-90-5, Aluminum, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(deposition onto ITO and org. **layers** of **electroluminescent device**, and oxidn. to form thin alumina **layer**)

IT **1344-28-1**, Aluminum oxide (Al2O3), uses
RL: **DEV (Device component use)**; USES (Uses)
(**electroluminescent device** with alumina thin films **between electrodes** and **org. layers**)

IT 2085-33-8, Tris(8-quinolinolato)aluminum
RL: **DEV (Device component use)**; PRP (Properties); USES (Uses)
(emissive **layer**; **electroluminescent device** with alumina thin films **between electrodes** and **org. layers**)

IT 65181-78-4, [1,1'-Biphenyl]-4,4'-diamine, N,N'-bis(3-methylphenyl)-N,N'-diphenyl-
RL: **DEV (Device component use)**; PRP (Properties); USES (Uses)
(hole transport; **electroluminescent device** with alumina thin films **between electrodes** and **org. layers**)

IT 7440-22-4, Silver, uses
RL: **DEV (Device component use)**; USES (Uses)
(magnesium cathode contg.; **electroluminescent device** with alumina thin films **between electrodes** and **org. layers**)

IT 7439-95-4, Magnesium, uses

RL: **DEV (Device component use)**; USES (Uses)
(silver contg. cathode; **electroluminescent device** with alumina thin films **between electrodes** and **org. layers**)

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Adachi, C; Appl Phys Lett 1990, V56, P799 HCAPLUS
(2) Burrows, P; IEEE Trans Electron Devices 1997, VED-44, P1188
(3) Hung, L; Appl Phys Lett 1997, V70, P152 HCAPLUS
(4) Ishii, H; IEEE Trans Electron Devices 1997, V44, P1295 HCAPLUS
(5) Kido, J; Science 1995, V267, P1332 HCAPLUS
(6) Li, F; Appl Phys Lett 1997, V70, P1233 HCAPLUS
(7) Ohmori, Y; Appl Phys Lett 1993, V62, P3250 HCAPLUS
(8) Ohmori, Y; Jpn J Appl Phys 1991, V30, PL1938
(9) Sheats, J; Science 1997, V277, P191 HCAPLUS
(10) Shen, Z; Science 1997, V276, P2009 HCAPLUS
(11) Tang, C; Appl Phys Lett 1987, V51, P913 HCAPLUS
(12) Van Slyke, S; Appl Phys Lett 1996, V69, P2160 HCAPLUS
(13) Wu, C; Appl Phys Lett 1996, V69, P3117 HCAPLUS

L37 ANSWER 43 OF 73 JICST-EPlus COPYRIGHT 2003 JST
AN 980780997 JICST-EPlus
TI Improvement of Emission Characteristic of Organic **EL** Device by Insertion of Aluminume Oxide Thin Film.
AU KUROSAKA YOSHITAKA; TADA NORIO; OMORI YUTAKA; YOSHINO KATSUMI
CS Osaka Univ., Grad. Sch.
SO Denshi Joho Tsushin Gakkai Gijutsu Kenkyu Hokoku (IEIC Technical Report (Institute of Electronics, Information and Communication Enginners)), (1998) vol. 98, no. 168(OME98 57-69), pp. 63-68. Journal Code: S0532B (Fig. 3, Ref. 13)
CY Japan
DT Journal; Article
LA Japanese
STA New
AB Improvement of electrode/organic interface has been studied in organic **electroluminescent** diodes which consist of 8-hydroxyquinoline aluminum (Alq3) and diamine derivative (TPD). Mono-layer size aluminum oxide(Al2O3) layer was inserted **between organic** layer and **electrode** (anode or cathode). Improvement of emission efficiency has been observed in the diode with mono-layer size Al2O3 layer inserted **between electrode** and **organic** layer. The mechanism of increase in emission efficiency has been discussed. (author abst.)
CC NC03082G; BK14070L (621.383:535.35; 539.23:547)
CT **electroluminescence**; aluminum complex; aluminum oxide; organic material; ultrathin film; quantum efficiency; buffer layer; nitrogen heterocyclic compound; hydroxy compound; polynuclear aromatic compound; aromatic amine
BT luminescence; aluminum compound; 3B group element compound; metal complex; complex(compound); coordination compound; compound(chemical); 3B group element complex; metal oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; material; thin film; membrane and film; efficiency; layer; heterocyclic compound; aromatic compound; amine

L37 ANSWER 44 OF 73 JICST-EPlus COPYRIGHT 2003 JST
AN 990013399 JICST-EPlus
TI Improvement of Electrode-Organic Interface in Organic **EL** Device.
AU OMORI YUTAKA; KUROSAKA YOSHITAKA; SAWATANI TAKUMI; YOSHINO KATSUMI

CS Osaka Univ.
SO Denki Gakkai Yuden, Zetsuen Zairyo Kenkyukai Shiryo, (1998) vol. DEI-98, no. 52-63, pp. 57-62. Journal Code: Z0908B
CY Japan
LA Japanese
STA New
AB Improvement of electrode/organic interface has been studied in organic **electroluminescent** diodes which consist of 8-hydroxyquinoline aluminum (Alq3) and diamine derivative (TPD). Mono-layer size aluminum oxide (Al2O3) layer was inserted **between organic** layer and **electrode** (anode or cathode). Improvement of emission efficiency has been observed in the diode with mono-layer size Al2O3 layer inserted **between electrode** and **organic** layer. The mechanism of increase in emission efficiency has been discussed. The emissive site has been investigated by inserting mono-layer size marker layer into the emissive layer. The efficient emissive site has been also discussed. (author abst.)

L37 ANSWER 45 OF 73 COMPENDEX COPYRIGHT 2003 EEI
AN 1999(3):3949 COMPENDEX
TI Organic light years ahead.
AU Sealy, Cordelia
SO European Semiconductor Design Production Assembly v 20 n 10 Oct 1998.p 19-20
CODEN: EUSEEK ISSN: 0265-6027
PY 1998
DT Journal
TC General Review
LA English
AB The display market still promises a great future and one technology, organic **light emitting** diode (**OLED**) displays, is bringing new life to this market.**OLED** consists of several thin semiconducting and **electroluminescent** **organic** layers **sandwiched between** **electrodes**.When a voltage is applied to metal electrode contacts, **light** is **emitted**, the color depending on the type of **electroluminescent** organic material used.The organic layers are in OLEDs are transparent to their own luminescence and most of the visible spectrum.**OLED** displays can employ a vertical staked pixel architecture.Each device in the stack **emits light** of its characteristic color through the adjacent organic layers, contacts and glass substrates.
CC 714.2 Semiconductor Devices and Integrated Circuits; 712.1.2 Compound Semiconducting Materials; 701.1 Electricity: Basic Concepts and Phenomena; 741 Light, Optics and Optical Devices; 714.1 Electron Tubes; 812.3 Glass
CT *Light emitting diodes; **Electroluminescence**; Substrates; Electrodes; Optical glass; Evaporation; Thermoanalysis; Sputter deposition; Semiconductor growth; Semiconducting organic compounds
ST Organic **light emitting** diode (**OLED**) displays; Active matrix liquid crystal displays (AMLCD)

L37 ANSWER 46 OF 73 COMPENDEX COPYRIGHT 2003 EEI
AN 1998(51):2530 COMPENDEX
TI Science and technology of organic **EL** displays.
AU Hudson, A.J. (Sharp Lab of Europe Ltd, Oxford, Engl)
MT Proceedings of the 1998 International Symposium on Information Theory, CLEO/EUROPE'98.
ML Glasgow, Scotland

MD 14 Sep 1998-18 Sep 1998
SO Conference on Lasers and Electro-Optics Europe - Technical Digest 1998.IEEE, Piscataway, NJ, USA.p 17 CME1
CODEN: 85PNA9
PY 1998
MN 49092
DT Conference Article
TC General Review
LA English
AB For display applications, organic **EL** offers the possibility of efficient, low voltage, multicolour operation coupled with low production costs and robust design. Typical organic **EL** devices, as shown in figure 1, consist of several **organic** layers deposited **between** two **electrodes**. The **organic** layers are usually deposited by vacuum sublimation or polymer spinning. On applying a voltage across the device oppositely charged carriers are injected from the two electrodes and are transported to the recombination zone. The carriers then recombine forming excited molecular states which decay radiatively giving out emission with a characteristic spectrum.Recent progress in this field will be summarised and the performance of current devices compared to that of established displays (principally LCDs and inorganic **EL**) as well as other new technologies (plasma, FEDs etc.). The key areas which are currently limiting performance, such as the injection efficiency, carrier transport and carrier recombination efficiency, will be discussed. Although the best devices already have lifetimes in excess of 10,000 hours, lifetime is still an issue and will also be considered.(Author abstract) 2 Refs.
CC 741.3 Optical Devices and Systems; 741.1 Light. Optics; 802.3 Chemical Operations; 801.4.1 Electrochemistry; 633.1 Vacuum Applications; 931.3 Atomic and Molecular Physics
CT *Luminescent devices; Deposition; Electronic density of states; Electrochemical electrodes; Sublimation; Vacuum applications; Charge transfer; Carrier concentration; Molecular dynamics; Luminescence of organic solids
ST Vacuum sublimation; Injection efficiency; Carrier transport; Carrier recombination

L37 ANSWER 47 OF 73 HCAPLUS COPYRIGHT 2003 ACS
AN 1997:684586 HCAPLUS
DN 127:352842
TI **Electroluminescent device**
IN Ilegems, Marc; Schar, Michel; Zuppiroli, Libero
PA Ecole Polytechnique Federale de Lausanne, Switz.; Ilegems, Marc; Schar, Michel; Zuppiroli, Libero
SO PCT Int. Appl., 28 pp.
CODEN: PIXXD2
DT Patent
LA French
IC ICM H05B033-28
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 36, 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9738558	A1	19971016	WO 1997-CH133	19970402
	W: JP, US				
	RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				

	EP 891686	A1	19990120	EP 1997-908105	19970402
	EP 891686	B1	19991006		
	R: BE, CH, DE, ES, FR, GB, IT, LI, NL, SE, FI				
	JP 2000508112	T2	20000627	JP 1997-535714	19970402
	US 6208074	B1	20010327	US 1998-155579	19981006
PRAI	CH 1996-863	A	19960403		
	WO 1997-CH133	W	19970402		

AB An **electroluminescent device** is described which includes a **layer** of **electroluminescent org.** semiconductor material **between** a 1st transparent **electrode** made of an n-type semiconductor material selected from nitrides and inorg. oxides, and a 2nd electrode.

ST **electroluminescent device** org semiconductor transparent electrode; LED org semiconductor transparent electrode; nitride semiconductor electrode transparent LED org; oxide semiconductor electrode transparent LED org; polymer org semiconductor LED transparent electrode; current voltage LED semiconductor org polymer

IT **Electrodes**
(LED electron injector; **electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

IT Nitrides
Oxides (inorganic), uses
RL: **DEV (Device component use)**; USES (Uses)
(LED semiconductor transparent electrode; **electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

IT Semiconductor materials
(LED; **electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

IT Electric current-potential relationship
Electroluminescent devices
(**electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

IT Polymers, uses
RL: **DEV (Device component use)**; USES (Uses)
(**electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

IT **1344-28-1**, Alumina, uses 2085-33-8, Hydroxyquinoline aluminum **13463-67-7D**, Titania, derivs. 15082-28-7, Butyl-PBD 18282-10-5, Tin dioxide 25617-97-4, Gallium nitride 50926-11-9, ITO 65181-78-4, [1,1'-Biphenyl]-4,4'-diamine, N,N'-bis(3-methylphenyl)-N,N'-diphenyl- 150144-97-1 174141-60-7, Aluminum gallium indium nitride 181024-45-3, Gallium indium nitride
RL: **DEV (Device component use)**; USES (Uses)
(**electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

IT 7429-90-5, Aluminum, uses **7439-93-2**, Lithium, uses **7440-21-3**, Silicon, uses **7440-31-5**, Tin, uses 7440-46-2, Cesium, uses **7440-70-2**, Calcium, uses 7704-34-9, Sulfur, uses **7782-49-2**, Selenium, uses 12385-13-6, Hydrogen atom, uses **13463-67-7D**, Titania, nonstoichiometric 13494-80-9, Tellurium, uses
RL: **DEV (Device component use)**; MOA (Modifier or additive use);

USES (Uses)
(**electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

IT 7440-59-7, Helium, uses 7727-37-9, Nitrogen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(**electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

IT 7664-41-7, Ammonia, processes 17108-85-9, Gallium monochloride
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(**electroluminescent device** including **electroluminescent** org. semiconductor material and transparent semiconductor electrode)

L37 ANSWER 48 OF 73 WPIX (C) 2003 THOMSON DERWENT
AN 1998-073961 [07] WPIX
CR 1997-251039 [23]
DNN N1998-059332 DNC C1998-024734
TI **Electroluminescent** element used in illumination for display, signal light generation element - has mixolimnion provided **between** cathode **electrode** and **organic EL layer**.
DC E12 L03 U11 U14 X26
IN KANEKO, N; SHIRASAKI, T; YAMADA, H
PA (CASK) CASIO COMPUTER CO LTD
CYC 2
PI JP 09312196 A 19971202 (199807)* 9p H05B033-14 <--
US 5834894 A 19981110 (199901) H01J001-62
ADT JP 09312196 A JP 1996-150473 19960523; US 5834894 A US 1996-711869 19960912
PRAI JP 1996-150473 19960523; JP 1995-260997 19950914
IC ICM H01J001-62; **H05B033-14**
ICS **H01L033-00**
AB JP 09312196 A UPAB: 19990107
The element has an **organic EL layer** interposed **between** cathode and anode **electrodes** (17,13). The cathode electrode is made of silver which is considered as first material. Between the cathode electrode and a transportation **layer mixolimnion** (16) made of Alq3 and Mg which is considered as second material, is provided.
The work function of the second material is smaller than that of the first material. A hole transportation layer (14) is formed **between** the anode **electrode** and the **organic EL layer**.
ADVANTAGE - Inhibits deterioration of cathode electrode. Increases **light emitting** brightness and **light emitting** luminous efficiency.
Dwg.1/7
FS CPI EPI
FA AB; GI
MC CPI: L03-C04
EPI: U14-J02; X26-J

L37 ANSWER 49 OF 73 INSPEC COPYRIGHT 2003 IEE DUPLICATE 6
AN 1998:5787839 INSPEC DN A9803-7340N-004; B9802-2530D-005
TI Controlling charge injection in organic electronic devices using

self-assembled monolayers.
AU Campbell, I.H.; Kress, J.D.; Martin, R.L.; Smith, D.L. (Los Alamos Nat. Lab., NM, USA); Barashkov, N.N.; Ferraris, J.P.
SO Applied Physics Letters (15 Dec. 1997) vol.71, no.24, p.3528-30. 17 refs.
Doc. No.: S0003-6951(97)01150-9
Published by: AIP
Price: CCCC 0003-6951/97/71(24)/3528/3/$10.00
CODEN: APPLAB ISSN: 0003-6951
SICI: 0003-6951(19971215)71:24L.3528:CCIO;1-R
DT Journal
TC Practical; Experimental
CY United States
LA English
AB We demonstrate control and improvement of charge injection in organic electronic devices by utilizing self-assembled monolayers (SAMs) to manipulate the Schottky energy barrier **between** a metal **electrode** and the **organic** electronic material. Hole injection from Cu electrodes into the **electroluminescent** conjugated polymer poly[2-methoxy,5-(2'-ethyl-hexyloxy)-1,4-phenylene vinylene] was varied by using two conjugated-thiol based SAMs. The chemically modified electrodes were incorporated in organic diode structures and changes in the metal/polymer Schottky energy barriers and current-voltage characteristics were measured. Decreasing (increasing) the Schottky energy barrier improves (degrades) charge injection into the polymer.
CC A7340N Metal-nonmetal contacts; A7330 Surface double layers, Schottky barriers, and work functions; B2530D Semiconductor-metal interfaces; B4260 Electroluminescent devices; B2560S Other field effect devices
CT CHARGE-COUPLED DEVICES; **ELECTROLUMINESCENT** DEVICES; MONOLAYERS; POLYMERS; SCHOTTKY BARRIERS
ST charge injection control; organic electronic devices; selfassembled monolayers; Schottky energy barrier; metal electrode; hole injection; **electroluminescent conjugated polymer**; poly[2-methoxy,5-(2'-ethyl-hexyloxy)-1,4-phenylene vinylene]; chemically modified electrodes; current-voltage characteristics; Cu
CHI Cu int, Cu el
ET Cu

L37 ANSWER 50 OF 73 HCAPLUS COPYRIGHT 2003 ACS DUPLICATE 7
AN 1997:601922 HCAPLUS
DN 127:337274
TI Electron spectroscopy studies of interface formation **between** metal **electrodes** and luminescent **organic** materials
AU Park, Y.; Choong, V.-E.; Hsieh, B. R.; Tang, C. W.; Wehrmeister, T.; Mullen, K.; Gao, Y.
CS Department of Physics and Astronomy, University of Rochester, Rochester, NY, 14627, USA
SO Journal of Vacuum Science & Technology, A: Vacuum, Surfaces, and Films (1997), 15(5), 2574-2578
CODEN: JVTAD6; ISSN: 0734-2101
PB American Institute of Physics
DT Journal
LA English
CC 66-4 (Surface Chemistry and Colloids)
AB Using x-ray and UPS (XPS and UPS), we have studied the formation of metal/org. interfaces in org. **electroluminescent devices**. Oligo(p-phenylenevinylenes) (OPV) and tris-(8-hydroxyquinoline)aluminum (Alq3) were used as the org. materials and Ca was used as the metallic

layer. Interfaces are formed differently by depositing org. **layer** on Ca and Ca on org. substrate. For Ca/OPV, UPS revealed a clear evidence for interface state formation upon Ca deposition. The evolution of XPS core level peak as a function of Ca **layer** thickness was consistent with the energy level bending picture. The XPS and UPS spectra for OPV/Ca as a function of org. **layer** thickness also confirmed the energy level bending. The data obtained allowed us to deduce the energy level diagram near the interface. Similar data for Alq3/Ca indicated that no electron injection barrier exists at this interface if the Alq3 optical band gap in the literature was used for estg. the energy position of the lowest unoccupied state.

ST interface metal electrode luminescent org material

IT **Electroluminescent devices**
Energy level
Interface
Spectroscopy
X-ray photoelectron spectra
(electron spectroscopy studies of interface formation **between** metal **electrodes** and luminescent **org**. materials)

IT **7440-70-2**, Calcium, miscellaneous
RL: MSC (Miscellaneous)
(electron spectroscopy studies of interface formation **between** metal **electrodes** and luminescent **org**. materials)

IT 2085-33-8, Tris-(8-hydroxyquinoline) aluminum 26009-24-5, Poly(p-Phenylenevinylene)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(electron spectroscopy studies of interface formation **between** metal **electrodes** and luminescent **org**. materials)

L37 ANSWER 51 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 1996-055974 JAPIO
TI FULL CONTACT IMAGE SENSOR AND ORGANIC **ELECTROLUMINESCENCE** ELEMENT
IN NAKATANI KENJI; NANBA NORIYOSHI; ARAI MICHIO
PA TDK CORP
PI JP 08055974 A 19960227 Heisei
AI JP 1994-190778 (JP06190778 Heisei) 19940812
PRAI JP 1994-190778 19940812
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1996
IC ICM **H01L027-146**
ICS C09K011-06; **H05B033-14**
AB PURPOSE: To provide a full contact image sensor and an organic **electroluminescence** of simple and compact constitution without complicated processing in a base part.
CONSTITUTION: In a full contact image sensor which irradiates a sensing object with light from a light source and enters its reflection light into a photosensor directly, a photosensor 6 and a light source 5 are arranged flush and a thin plate 3 is arranged on the photosensor and the light source. The light source is constituted of an organic **EL** element of a thin film, for example. Furthermore, the organic **EL** element is provided with an insulation film **between** an **electrode** and an **organic** compound **layer** to enable selection of a **light emitting** part.

L37 ANSWER 52 OF 73 INSPEC COPYRIGHT 2003 IEE
AN 1996:5385381 INSPEC DN A9621-7860F-005

TI Organic **electroluminescence** and applications.
AU Dubois, C.; Le Barny, P.; Bouche, C.M.; Berdague, P.; Facoetti, H.; Robin, P. (Lab. Central de Recherches, Thomson-CSF, Domaine de Corbeville, France)
SO Photoactive Organic Materials. Science and Applications. Proceedings of the NATO Advanced Research Workshop
Editor(s): Kajzar, F.; Agranovich, V.M.; Lee, C.Y.-C.
Dordrecht, Netherlands: Kluwer Academic Publishers, 1996. p.313-23 of x+572 pp. 9 refs.
Conference: Avignon, France, 25-30 June 1995
Sponsor(s): NATO
ISBN: 0-7923-3973-8
DT Conference Article
TC General Review; Experimental
CY Netherlands
LA English
AB When an **organic** conjugated material is **sandwiched between** two suitable **electrodes** and a voltage is applied, visible **light** is **emitted**. Such an emission produced by the action of an electrical current is called **electroluminescence** (**EL**). In this paper we present a brief history, the main characteristics and materials of organic luminescence. We present also some performances of materials and the problems to be solved for the future development.
CC A7860F Electroluminescence; A0130R Reviews and tutorial papers; resource letters
CT **ELECTROLUMINESCENCE**; ORGANIC COMPOUNDS; REVIEWS
ST **organic electroluminescence**; organic conjugated material; electrodes; voltage; visible light; electrical current; **electroluminescence**; organic luminescence

L37 ANSWER 53 OF 73 INSPEC COPYRIGHT 2003 IEE DUPLICATE 8
AN 1997:5617127 INSPEC DN A9715-7860F-003; B9708-4260D-007
TI Organic **electroluminescence**: materials and devices.
AU Kalinowski, J. (Istituto di Fotochimica e Radiazioni di Alta Energia, CNR, Bologna, Italy)
SO Proceedings of the SPIE - The International Society for Optical Engineering (1996) vol.2780, p.293-303. 43 refs.
Published by: SPIE-Int. Soc. Opt. Eng
Price: CCCC 0 8194 2166 9/96/$6.00
CODEN: PSISDG ISSN: 0277-786X
SICI: 0277-786X(1996)2780L.293:OEMD;1-Z
Conference: Metal/Nonmetal Microsystems: Physics, Technology, and Applications. Polanica Zdroj, Poland, 11-14 Sept 1995
Sponsor(s): SPIE; State Committee for Sci. Res.; Tech. Univ. Wroclaw; et al
DT Conference Article; Journal
TC General Review; Practical; Experimental
CY United States
LA English
AB **Electroluminescence** (**EL**) in organics is a phenomenon of both fundamental and practical interest. Defined as direct conversion of electricity into light, it incorporates many physical processes which are not yet fully understood. Considered originally as an organic analogue of the Destriau effect, the high-field or intrinsic **EL** found previously in inorganic phosphors remains still obscure since narrow bands in organic solids rule out electron acceleration to energies allowing impact generation of electronic excited states. Therefore. The search for

wide-band organic materials is a challenge to design and to fabricate organic intrinsic **EL** devices. The recombination radiation following the excess charge carrier injection into a luminescent material stands for injection **EL**. This type of **EL** is commonly accepted as a basis for the **emission** of **light** from **organic** materials **sandwiched between** metal **electrodes**. In this review, some consequences of the band width and energy level positions in low-molecular weight organic materials and polymers are discussed. Fundamental concepts are illustrated using the notions of recombination (tau rec) and transit (tau T) times of charge carriers. Injection-controlled (tau rec> tau T) and volume-controlled (tau rec< tau T) injection **EL** modes are distinguished in organic **light emitting**-diodes (LEDs). Two routes to fabricate spectrally tunable organic LEDs are discussed: (a) building multilayer devices with various materials as chromophores (emitters) and (b) employing single-layer conjugated polymer matrix, or molecularly-doped non-conjugated polymers with appropriate selection of the optically active component important factors affecting the recombination routes and production of emitting states as is demonstrated on **EL** from single organic crystals. Using photoinjecting contacts instead of dark-injecting electrodes allows to design a unique light transducer combining an organic **EL** diode with the photosensitive film. Selected examples of organic LEDs and light transducers are presented. Some directions for further work are given.

CC A7860F Electroluminescence; A7135 Excitons and related phenomena; A0130R Reviews and tutorial papers; resource letters; B4260D Light emitting diodes; B4220 Luminescent materials

CT **ELECTROLUMINESCENCE**; ELECTRON TRAPS; ELECTRON-HOLE RECOMBINATION; EXCITONS; **LIGHT EMITTING** DIODES; OPTICAL POLYMERS; ORGANIC COMPOUNDS; POLYMER BLENDS; REVIEWS

ST **organic electroluminescence**; organics; **high-field EL**; narrow bands; impact generation; electronic excited states; wide-band organic materials; **organic intrinsic EL devices**; recombination radiation; excess charge carrier injection; luminescent material; organic materials; metal electrodes; review; band width; energy level positions; low-molecular weight organic materials; polymers; **injection EL modes**; **organic light emitting-diodes**; LED; spectrally tunable organic LEDs

L37 ANSWER 54 OF 73 INSPEC COPYRIGHT 2003 IEE

AN 1997:5693308 INSPEC DN A9720-7860F-005; B9710-4220-027

TI **Electroluminescence** in organic solids: phenomenon and applications.

AU Kalinowski, J. (FRAE, CNR, Bologna, Italy)

SO Molecular Physics Reports (1996) vol.14, p.103-18. 43 refs.
Published by: Osrodek Wydawnictw Naukowych
CODEN: MPREFZ
Conference: 10th National Conference Molecular Crystals. Kiekrz, Poland, 3-6 Sept 1995

DT Conference Article; Journal

TC Application; General Review; Practical; Experimental

CY Poland

LA English

AB **Electroluminescence** (**EL**) in organic solids is a phenomenon of both fundamental and practical interest. Defined as direct conversion of electricity into light it incorporates many physical processes which are not yet fully understood. Considered originally as an organic analogue of the Destriau effect that is high-field or intrinsic

EL found previously in inorganic phosphors, remains still obscure since narrow bands in organic solids rule out electron acceleration to energies allowing impact generation of electronic excited states. Therefore, the search for wide-band organic materials is a challenge to design and to fabricate organic intrinsic **EL** devices. The recombination radiation following the excess charge carrier injection into a luminescent material stands for injection **EL**. This type of **EL** is commonly accepted as a basis for the **emission** of **light** from **organic** materials **sandwiched between** metal **electrodes**. In this review, some consequences of the band width and energy level positions in low-molecular weight organic materials and polymers are discussed. Fundamental concepts are illustrated using the notions of recombination (tau rec) and transit (tau T) times of charge carriers. Injection-controlled (tau rec< tau T) and volume-controlled (tau rec< tau T) injection **EL** modes are distinguished in organic **light-emitting**-diodes (LEDs). Two routes to fabricate spectrally tunable organic LEDs are discussed: (a) building multilayer devices with various materials as chromophores (emitters) and (b) employing single-layer conjugated polymer systems with different main-chain molecular structures and blending luminescent polymers into the host polymer matrix, or molecularly-doped non-conjugated polymers with appropriate selection of the optically active component. Charge carrier trapping and excitonic interactions are important factors affecting the recombination routes and production of emitting states as is demonstrated on **EL** from single organic crystals. Using photoinjecting contacts instead of dark-injecting electrodes allows to design a unique light transducer combining an organic **EL** diode with the photosensitive film. Selected examples of organic LEDs and light transducers are presented. Some directions for further work are given.

CC A7860F Electroluminescence; A4270F Other optical materials; A0130R Reviews and tutorial papers; resource letters; A7135 Excitons and related phenomena; B4220 Luminescent materials; B4260D Light emitting diodes

CT **ELECTROLUMINESCENCE**; ELECTRON-HOLE RECOMBINATION; EXCITONS; **LIGHT EMITTING** DIODES; OPTICAL POLYMERS; ORGANIC COMPOUNDS; POLYMER BLENDS; REVIEWS

ST **electroluminescence**; organic solids; **intrinsic EL**; narrow bands; electron acceleration; impact generation; electronic excited states; wide-band organic materials; **organic intrinsic EL devices** ; recombination radiation; excess charge carrier injection; luminescent material; **injection EL**; metal electrodes; review; band width; energy level positions; low-molecular weight organic materials; polymers; recombination; transit times; excitons; **light-emitting-diodes**; conjugated polymers

L37 ANSWER 55 OF 73 COMPENDEX COPYRIGHT 2003 EEI

AN 1996(9):1449 COMPENDEX

TI Ultraviolet **electroluminescence** from an organic **light emitting** diode.

AU Berggren, Magnus (Linkoping Univ, Linkoping, Sweden); Granstrom, Magnus; Inganas, Olle; Andersson, Mats

SO Advanced Materials v 7 n 11 Nov 1995.p 900-903 CODEN: ADVMEW ISSN: 0935-9648

PY 1995

DT Journal

TC Experimental

LA English

AB Two **organic** layers are **sandwiched between** the **electrodes**. One layer consists of a blend of PBD

(2-(4-biphenyl)-5-(4-t-butylphenyl)-1,3,4-oxadiazole) and PTOPT (poly left bracket 3-(4-octylphenyl)-2,2 prime -bitiophene right bracket , the second of an evaporated layer of PBD only. Scanning force microscopy imaging and optical investigations indicate that phase separation exists. At the same time a fraction of the polymer is molecularly dispersed in the PBD phase. This composition results in the injection and recombination properties that lead to a **light emitting** diode with an emission maximum at 394nm.The highest measured external quantum efficiency in these devices is 0.1%. Since one part of the emission just below 394 nm is located in the visible region, the emission color is best described as violet.18 Refs.

CC 741.1 Light. Optics; 714.2 Semiconductor Devices and Integrated Circuits; 815.1.1 Organic Polymers; 741.3 Optical Devices and Systems; 931.4 Quantum Theory; 701.1 Electricity: Basic Concepts and Phenomena

CT ***Electroluminescence**; Current voltage characteristics; Organic polymers; Ultraviolet radiation; Luminescent devices; Photoluminescence; Imaging techniques; Quantum efficiency; **Light emitting** diodes; **Light emission**

ST Ultraviolet **electroluminescence**; Low molecular weight compound; Wavelength

L37 ANSWER 56 OF 73 JICST-EPlus COPYRIGHT 2003 JST

AN 950524781 JICST-EPlus

TI Polarization Characteristics of **EL** Output from Film Edge of **Organic EL** Device **Sandwiched** by Metal **Electrodes.**

AU UEDA TAKASHI; HIRAMOTO MASAHIRO; YOKOYAMA MASAAKI

CS Osaka Univ., Fac. of Eng.

SO Nippon Kagakkai Koen Yokoshu, (1995) vol. 69th, no. 2, pp. 632. Journal Code: S0493A
ISSN: 0285-7626

CY Japan

LA Japanese

STA New

AB Polarization characteristics of **EL** output from film edge of **organic EL** device **sandwiched** by metal **electrodes** were investigated. In the case of device having very thin organic layer, strongest **EL** intensity was observed for the **EL** light having the electric field perpendicular to organic film (TM mode), in spite of its severe waveguiding loss by the metal absorption. (author abst.)

L37 ANSWER 57 OF 73 JICST-EPlus COPYRIGHT 2003 JST

AN 950386846 JICST-EPlus

TI Metal Electrodes for Organic **Electroluminescent** Devices.

AU INABA RITSUO

CS Matsushita Electr. Ind. Co., Ltd., Cent. Res. Lab.

SO Denshi Joho Tsushin Gakkai Gijutsu Kenkyu Hokoku (IEIC Technical Report (Institute of Electronics, Information and Communication Enginners)), (1995) vol. 94, no. 535(OME94 78-83), pp. 31-36. Journal Code: S0532B (Fig. 6)

CY Japan

DT Journal; Article

LA Japanese

STA New

AB The decrease of the efficiency of the organic **electroluminesent** devises was examined for various metal electrodes. Work function of the metal electrodes, Mg, MgAg, Al, AlLi were measured and compare with the

amplitude of the **electroluminescence**. Work function at the metal surface rapidly increased after fabrication but at the surface **between organic** layer and metal **electrode** kept constant over 1000 central hours. (author abst.)
CC NC03082G (621.383:535.35)
CT photoelectric device; **electroluminescence**; organic semiconductor; electrode; magnesium; aluminum; electrode material; efficiency; work function; **light emission**; time course; aluminum base alloy; lithium base alloy; lifetime
BT solid state device; luminescence; semiconductor; organic conductor; conductor; object; alkaline earth metal; metallic element; element; third row element; 3B group element; electric material; material; function(mathematics); mapping(mathematics); potential; variation; light alloy; nonferrous alloy; alloy; metallic material

L37 ANSWER 58 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 1994-188073 JAPIO
TI ORGANIC FILM ELEMENT
IN SHOJI TAKESHI; MORI YOSHIHIKO
PA ASAHI CHEM IND CO LTD
PI JP 06188073 A 19940708 Heisei
AI JP 1993-195948 (JP05195948 Heisei) 19930806
PRAI JP 1992-216888 19920814
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1994
IC ICM **H05B033-22**
ICS C23C014-06; **H01L031-04**; **H01L031-0344**
ICA C09K011-06
AB PURPOSE: To reduce non-**light emitting** parts in a **light emission** surface, and improve **light emission** efficiency in an organic **electroluminescent** element having an **organic layer between** a positive **electrode** and a negative electrode by providing an island-like silver distribution **layer** between the **organic layer** and the negative electrode.
CONSTITUTION: In an **organic electroluminescent** element having an **organiclayer between electrodes** comprising a positive electrode and a negative electrode, a silver distribution layer which is seen like an island by observation by a scan type electron microscope or a transmission type electron microscope is provided between the layer most on the negative electrode side and the negative electrode. The organic **electroluminescent** element **emits light** when holes charged from the positive electrode and electrons charged from the negative electrode are recombined with each other in a **light emission** layer, where charge of the electrons have effects of an interface condition because it is performed at the interface **between** the negative **electrode** and the **organic layer**. By providing the silver distribution layer at the interface **between** the negative **electrode** and the **organic layer**, tightness **between** the negative **electrode** and the **organic layer** is improved to form a new hierarchy at the interface. As a result, non-**light emitting** parts in the **light emission** surface can be reduced, thereby **light emission** efficiency can be improved regardless of what is used for material of the negative electrode.

L37 ANSWER 59 OF 73 JAPIO COPYRIGHT 2003 JPO

AN 1994-151062 JAPIO
TI MANUFACTURE OF **LIGHT EMITTING** ELEMENT
IN MIYASHITA SATORU
PA SEIKO EPSON CORP
PI JP 06151062 A 19940531 Heisei
AI JP 1992-302646 (JP04302646 Heisei) 19921112
PRAI JP 1992-302646 19921112
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1994
IC ICM **H05B033-26**
ICS **H01L033-00; H05B033-10**
AB PURPOSE: To provide an **organic light emitting layer between electrodes**, laminate a dry film resist on an upper electrode layer, perform exposure, development with alkali aqueous solution, and etching, and provide a large capacity displayable electrode pattern.
CONSTITUTION: An ITO, is evaporated on a glass base 11 followed by photographic etching to form a lower electrode pattern 12. An oxadiazole derivative is evaporated to form a positive hole injection layer 13, and anthracene is evaporated to form a **light emitting** layer 14, and an upper electrode layer 15 of In is superposed thereon. A dry film resist is treated in a determined way to form a resist layer 16. It is exposed through a photo-mask 17 and developed with 1% aqueous solution of sodium carbonate to pattern the resist layer 16. The IN is etched with aqueous solution of hydrochloric acid to provide the upper electrode 15. The positive hole injection layer 13 and the **light emitting** layer 14 are never affected nor deformed, and the **light emitting** characteristic uniform within a face can be provided. The time divided drive in line can be performed, and satisfactory display characteristic is exhibited.

L37 ANSWER 60 OF 73 JAPIO
AN 1993-251186 JAPIO
TI **LIGHT EMITTING** ELEMENT AND MANUFACTURE THEREOF
IN MIYASHITA SATORU
PA SEIKO EPSON CORP
PI JP 05251186 A 19930928 Heisei
AI JP 1992-49891 (JP04049891 Heisei) 19920306
PRAI JP 1992-49891 19920306
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1993
IC ICM **H05B033-26**
ICS **H01L029-28; H01L033-00; H05B033-10**
AB PURPOSE: To provide an organic **light emitting** element having an electrode pattern capable of displaying a large capacity, having a high initial yield and a high in-plane uniformity, and excellent in long-term reliability.
CONSTITUTION: In a **light emitting** element having at least an **organic light emitting layer** 14 **between electrodes**, at least one of the electrodes is constituted of a high polymer layer 15 where conductive particles are dispersed. Application of a high polymer solution where conductive particles are dispersed by a printing method can provide a pattern, followed by fixing the aid of heat, thus manufacturing the **light emitting** element. Otherwise, application of a solution including conductive particles and high polymer molecules by a printing method can provide a pattern, followed by polymerization and fixing by heating or ultraviolet ray irradiation, thereby manufacturing the **light emitting** element.

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L37 ANSWER 61 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 1992-206296 JAPIO
TI ORGANIC **ELECTROLUMINESCENT** ELEMENT
IN SANO KENJI; KAWADA YASUSHI; URANO TAEKO; MORI YASUSHI
PA TOSHIBA CORP
PI JP 04206296 A 19920728 Heisei
AI JP 1990-333035 (JP02333035 Heisei) 19901129
PRAI JP 1990-333035 19901129
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1992
IC ICM **H05B033-14**
ICS C09K011-06; H01J029-20; **H01L033-00**
AB PURPOSE: To enable long life of **EL** element by providing an **organic EL layer** with a structural formula of Al(C<SB>9</SB>H<SB>6</SB>ON)<SB>3</SB>, containing a compound showing specified absorbing peaks in a far inflared radiation absorbing spectra. CONSTITUTION: On a glass base, ITO electrode 2, hall transport layer 3, **EL** layer 4 and Mg-Al electrode 5 are formed in suquence, and a power supply 6 is connected **between** the **electrodes** 2, 5. The **organic EL layer** 4 is provided with a structural formula of Al(C<SB>9</SB>H<SB>6</SB>ON)<SB>3</SB> and in a range 400-440cm<SP>-1</SP> in far inflared radiation absorbing spectra a compound showing two or more absorbing peas within an intencity ratio 1:1:5, i.e., isomer of alumioxyquinolinic complex is contained. It is thus possible to extend the service life of **EL** element.
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L37 ANSWER 62 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 1991-037293 JAPIO
TI ORGANIC **ELECTROLUMINESCENT** ELEMENT
IN TASHIRO MASASHI; MATAGA SHUNTARO; TAKAHASHI KAZUFUMI; SATO YOSHIHARU; MAEDA SHUICHI
PA MITSUBISHI KASEI CORP
PI JP 03037293 A 19910218 Heisei
AI JP 1989-172177 (JP01172177 Heisei) 19890704
PRAI JP 1989-172177 19890704
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1991
IC ICM C09K011-06
ICS **H01L033-00; H05B033-14**
AB PURPOSE: To enable an organic **electroluminescent** element comprising a pair of electrodes each comprising at least two conductive layers and, disposed **between** said **electrodes**, an **organic** hole injection transportation **layer** and an **organic light-emitting layer** to **emit light** of improved luminance at a low voltage by incorporating a specific compound in the **organic light -emitting layer**.
CONSTITUTION: An organic **electroluminescent** element comprising a pair of electrodes each comprising two conductive layers and, disposed **between** said **electrodes**, an **organic** hole injection transportation **layer** and an **organic light- emitting layer**, wherein the **organic light-emitting layer** contains a compound represented by formula I [wherein A to D each represent a substituted or unsubstituted aromatic hydrocarbon group; X represents a substituted or unsubstituted nitrogen atom, a sulfur atom, an oxygen atom or a selenium atom; and Y represents a hydrogen atom, a cyano

group, an amide group, an ester group, an alkyl group, a carboxyl group, a substituted or unsubstituted aromatic hydrocarbon group or a substituted or unsubstituted aromatic heterocyclic group] (e.g. a compound represented by formula II).
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L37 ANSWER 63 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 1991-037292 JAPIO
TI ORGANIC **ELECTROLUMINESCENT** ELEMENT
IN SAITO SHOGO; TSUTSUI TETSUO; ADACHI CHIHAYA; TASHIRO MASASHI; MATAGA SHUNTARO
PA MITSUBISHI KASEI CORP
PI JP 03037292 A 19910218 Heisei
AI JP 1989-172176 (JP01172176 Heisei) 19890704
PRAI JP 1989-172176 19890704
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1991
IC ICM C09K011-06
ICS **H01L033-00; H05B033-14**
AB PURPOSE: To enable an organic **electroluminescent** element comprising a pair of electrodes each comprising at least two conductive layers and, disposed **between** the **electrodes**, an **organic** hole injection transportation **layer** and an **organic light-emitting layer** to **emit light** of improved luminance at a low voltage by incorporating a specific compound in the **organic light -emitting layer**.
CONSTITUTION: An organic **electroluminescent** element comprising a pair of electrodes each comprising two conductive layers and, disposed **between** the **electrodes**, an **organic** hole injection transportation **layer** and an **organic light- emitting layer**, wherein the **organic light-emitting layer** contains a compound represented by formula I [wherein A and B each represent a substituted or unsubstituted aromatic hydrocarbon group; X represents a substituted or unsubstituted nitrogen atom, a sulfur atom, an oxygen atom or a selenium atom; and Y represents a nitrogen atom or a substituted or unsubstituted carbon atom] (e.g. a compound represented by formula II).
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L37 ANSWER 64 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 1990-251429 JAPIO
TI TRANSPARENT CONDUCTIVE FILM
IN WAKI HIROSHI; OHASHI YUTAKA; FUKUDA NOBUHIRO
PA MITSUI TOATSU CHEM INC
PI JP 02251429 A 19901009 Heisei
AI JP 1989-71795 (JP01071795 Heisei) 19890327
PRAI JP 1989-71795 19890327
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1990
IC ICM B32B009-00
ICS H01B005-14; **H01L033-00**
ICA **H05B033-28**
AB PURPOSE: To obtain a transparent conductive film suitable for a high capacity **light emitting** element having flexibility by constituting the transparent conductive film formed on a polymer film of an oxide film based on indium oxide and containing tin oxide and antimony oxide in a specific amount with respect to indium oxide.
CONSTITUTION: A transparent film is obtained by forming an oxide film

based on indium oxide and containing 2-25wt.% of tin oxide and antimony oxide on a polymer film in a membrane form and especially suitable for the substrate of an **EL** element. A **light emitting** element formed by setting the transparent conductive film to at least one **electrode** and providing an **org.** compound membrane **layer between** two opposed **electrodes** as a layer developing **light emitting** function has flexibility and can be prepared as a uniform membrane having large area and rich in mass productivity and advantageous from the aspect of cost. In the **org.** compound membrane **layer,** an **org.** compound having high **light emitting** quantum efficiency and a π electron system easy to receive external perturbation and easily excited is used suitably.
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L37 ANSWER 65 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 1990-251428 JAPIO
TI TRANSPARENT CONDUCTIVE FILM
IN WAKI HIROSHI; OHASHI YUTAKA; FUKUDA NOBUHIRO
PA MITSUI TOATSU CHEM INC
PI JP 02251428 A 19901009 Heisei
AI JP 1989-71794 (JP01071794 Heisei) 19890327
PRAI JP 1989-71794 19890327
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1990
IC ICM B32B009-00
ICS H01B005-14; **H01L033-00**
ICA **H05B033-28**
AB PURPOSE: To obtain a transparent conductive film suitable for a high capacity **light emitting** element having flexibility by constituting the transparent conductive film formed on a polymer film of a composite oxide layer based on indium oxide and consisting of tin oxide or tin oxide and antimony oxide and a metal layer composed of gold, silver, palladium or a mixed alloy of them.
CONSTITUTION: The transparent conductive film formed on a polymer film is composed of a laminated film consisting of a composite oxide layer based on indium oxide and composed of tin oxide or tin oxide and antimony oxide and a metal layer composed of gold, silver, palladium or a mixed alloy of them and especially suitable for the substrate of an **EL** element.
A **light emitting** element formed by setting the transparent conductive film to at least one **electrode** and providing an **org.** compound membrane **layer between** two opposed **electrodes** as a layer developing **light emitting** function has flexibility and can be prepared as an uniform membrane having a large area and is rich in mass productivity and advantageous from the aspect of cost.
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L37 ANSWER 66 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 1990-196475 JAPIO
TI THIN FILM **LIGHT-EMITTING** ELEMENT
IN OHASHI YUTAKA; WAKI HIROSHI; FUKUDA NOBUHIRO
PA MITSUI TOATSU CHEM INC
PI JP 02196475 A 19900803 Heisei
AI JP 1989-13983 (JP01013983 Heisei) 19890125
PRAI JP 1989-13983 19890125
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 1990
IC ICM **H01L033-00**
ICS **H05B033-14**

AB PURPOSE: To obtain a highly bright and stable injection type thin film **EL** element by providing a **light-emitting** function manifestation layer which laminates an n-type inorganic semiconductor thin film **layer** and two **organic** compound thin film **layers between** two **electrode** layers in which at least one of them is transparent or translucent. CONSTITUTION: Two electrode layers 2 and 7 in which at least one of them is transparent or translucent are prepared and a **light-emitting** function manifestation layer 6 which laminates an n-type inorganic semiconductor thin film **layer** 3 and two **organic** compound thin film **layers** 4 and 5 is provided between two electrode layers. It is suitable that the foregoing two **organic** compound thin film **layers** 4 and 5 are composed of the layer 4 of a substance which is excited easily and the layer 5 of a substance having a large home mobility. For example, an ITO film and an SnO<SB>2</SB> film are formed on a glass substrate 1 and the first transparent electrode layer 2 is formed. An n-type a-Si:H film 3, aluminum oxine complex (Al(Ox)<SB>3</SB>) thin film 4, and a large hole mobility layer 5 having a tetraphenyl thiophene skeleton are laminated after forming them on the electrode layer 2. A gold thin film is deposited on the above layer 5 and then the second electrode layer 7 is formed.

L37 ANSWER 67 OF 73 INSPEC
AN 1987:2961088 INSPEC DN A87113289
TI **Electroluminescence** in thin films of organic dyes.
AU Hayashi, S.; Era, M.; Etoh, H.; Tsutsui, T.; Saito, S.; Wang, T.T.; Matsuoka, S.
SO Engineering Sciences Reports, Kyushu University (June 1987) vol.8, no.2, p.181-8. 26 refs.
CODEN: SRKHEK ISSN: 0388-1717
DT Journal
TC Experimental
CY Japan
LA Japanese
AB **Electroluminescence** (**EL**) in three types of organic thin films, amorphous pyrazoline films prepared by vacuum vapor deposition, cyanine dye multilayers prepared by the Langmuir-Blodgett method and crystalline perylene films by vacuum vapor deposition, were investigated. The **organic** thin films were sandwiched **between** an electron-injection **electrode** (Al or In) and a hole-injection electrode (Au, indium-tin-oxide, CuI, or poly(3-methylthiophene) film). **EL** was confirmed to originate from recombination of injected holes and electrons. The poly(3-methylthiophene) electrode was found to be the most excellent for hole injection. By use of this electrode, the threshold voltage for emission markedly lowered. Because the rate of carrier recombination was determined by the efficiency of electron injection, the improvement of an electron-injection electrode brought about a large increase of **EL** efficiency. In, which possesses low work function, was found to be favorable for an electron-injection electrode.
CC A7860F Electroluminescence
CT **ELECTROLUMINESCENCE**; ELECTRON-HOLE RECOMBINATION; LANGMUIR-BLODGETT FILMS; LUMINESCENCE OF ORGANIC SOLIDS; ORGANIC COMPOUNDS; THIN FILMS; VACUUM DEPOSITED COATINGS
ST emission threshold voltage; **electroluminescence**; thin films; organic dyes; amorphous pyrazoline films; cyanine dye multilayers; perylene films; recombination; injected holes; electrons; carrier

recombination
ET Al; In; Au; Cu*I; CuI; Cu cp; cp; I cp

L37 ANSWER 68 OF 73 COMPENDEX COPYRIGHT 2003 EEI
AN 1987(11):186489 COMPENDEX
TI **ELECTROLUMINESCENCE** IN AMORPHOUS FILMS OF 1,3,5-TRIARYL-2-PYRAZOLINES.
AU Hayashi, S. (AT&T Bell Lab, Murray Hill, NJ, USA); Wang, T.T.; Uchida, Y.; Saito, S.
MT Extended Abstracts - Fall Meeting (168th Society Meeting), The Electrochemical Society.
MO Electrochemical Soc, Pennington, NJ, USA
ML Las Vegas, NV, USA
MD 13 Oct 1985-18 Oct 1985
SO Electrochemical Society Extended Abstracts v 85-2.Publ by Electrochemical Soc, Pennington, NJ, USA p 593
CODEN: ESABB6 ISSN: 0160-4619
PY 1985
MN 09038
DT Conference Article
LA English
AB Compounds of 1,3,5-triaryl-2-pyrazolines are known to be carrier transport materials which fluoresce and exhibit a stable glassy state at room temperature.We have detected, for the first time, a noticeable amount of ac-induced **electroluminescence** (**EL**) in amorphous films (ca.about 1 to 3 mu m thick) which were prepared by vacuum depositing these compounds onto glass substrates coated with a transparent electrode (Indium-Tin-Oxide, ITO).The results suggest that the **electroluminescence** behavior of the systems might have originated in the bulk of pyrazoline films and not at the interfaces **between** the **electrodes** and the **organic** materials.(Edited author abstract) 3 refs.
CC 804 Chemical Products; 701 Electricity & Magnetism; 741 Optics & Optical Devices
CT *ORGANIC COMPOUNDS:Thin Films; FILMS:Amorphous; **ELECTROLUMINESCENCE**:Measurements
ST CARRIER TRANSPORT MATERIALS; TRANSPARENT ELECTRODE; PYRAZOLINE; EXTENDED ABSTRACT

L37 ANSWER 69 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 2002-110359 JAPIO
TI ORGANIC **ELECTROLUMINESCENT** ELEMENT
IN YONEYAMA HIROTO; OKUDA DAISUKE; HIROSE HIDEKAZU; SEKI MIEKO; MASHITA KIYOKAZU; AGATA TAKESHI; SATO KATSUHIRO
PA FUJI XEROX CO LTD
PI JP 2002110359 A 20020412 Heisei
AI JP 2000-303664 (JP2000303664 Heisei) 20001003
PRAI JP 2000-303664 20001003
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002
IC ICM **H05B033-14**
ICS **H01L051-00; H05B033-22**
AB PROBLEM TO BE SOLVED: To provide an organic **electroluminescent** element that is easy to manufacture and has a sufficient luminance and excellent durability.
SOLUTION: In the organic **electroluminescence** element in which one or plural **organic** compound **layers** are interposed **between** a pair of **electrodes** made of a positive electrode and a negative electrode, of which one is at least transparent

or semi-transparent, at least one **layer** of the **organic** compound **layers** contains one or more kind of a charge transfer polymer made of a repeating unit that contains as a partial structure at least one kind selected from the structure as expressed in Formula (I-1) and (I-2). In the formulae, each of Ar1-Ar6 expresses independently a substituted or unsubstituted aryl group, each of R1-R3 expresses independently hydrogen atom, an alkyl group or the like, and each of X1 and X2 expresses independently a substituted or unsubstituted bivalent aromatic group, T expresses a bivalent straight chain hydrocarbon group or the like having a carbon number of 1 to 6, and k expresses 0 or 1, and each of m and n express independently an integer of 1 or more.
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L37 ANSWER 70 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 2002-075654 JAPIO
TI ORGANIC **ELECTROLUMINESCENT** ELEMENT
IN HIROSE HIDEKAZU; OKUDA DAISUKE; YONEYAMA HIROTO; SEKI MIEKO; MASHITA KIYOKAZU; AGATA TAKESHI; SATO KATSUHIRO
PA FUJI XEROX CO LTD
PI JP 2002075654 A 20020315 Heisei
AI JP 2000-256801 (JP2000256801 Heisei) 20000828
PRAI JP 2000-256801 20000828
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2002
IC ICM **H05B033-22**
ICS C08G065-34; C09K011-06; **H01L051-00; H05B033-14**
AB PROBLEM TO BE SOLVED: To provide an organic **electroluminescent** element which uses charge transporting polymer having good stability, preservation stability, solubility, and compatibility at **emitting** of **light**, has high luminescence intensity, brings out a stable performance even after repeated use, and can be easily manufactured. SOLUTION: In an organic **electroluminescent** element with one or more **organic** compound **layers** pinched **between** a pair of **electrodes** consisting of an anode and a cathode at least one of which is transparent or translucent, at least one **layer** from the **organic** compound **layers** includes one or more kinds of charge transporting polyethers consisting of repeated units as a partial structure selected at least one kind from structures expressed in formulae (I-1) and (I-2). In the formulae, Ar expresses a substituted or non-substituted univalent polynuclear aromatic ring or the like having 3 to 10 aromatic ring numbers, X expresses a substituted or non-substituted bivalent aromatic group, T expresses a bivalent straight-chain hydrocarbon group or the like having 1 to 6 carbon numbers, m expresses integers of 1 to 3 and k expresses 0 or 1.
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L37 ANSWER 71 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 2001-257076 JAPIO
TI ORGANIC **EL** ELEMENT
IN KIDO JUNJI; EBISAWA AKIRA
PA TDK CORP
KIDO JUNJI
PI JP 2001257076 A 20010921 Heisei
AI JP 2000-68363 (JP2000068363 Heisei) 20000313
PRAI JP 2000-68363 20000313
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
IC ICM **H05B033-14**
ICS C09K011-06; **H01L033-00; H05B033-22**
AB PROBLEM TO BE SOLVED: To realize an organic **EL** element which

enables to achieve reliability of thermal stability and the like and high efficiency in the high brightness region at the same time by doping a triplet luminous material in an organic host material, particularly, in a non-conjugated unsaturated polymer.
SOLUTION: The organic **EL** element comprises a hole injecting electrode, an electron injecting electrode and a luminous **layer** composed of an **organic** host material and a dopant disposed **between** these **electrodes**. The above **organic** material is made of a non-conjugated unsaturated polymer material and the above dopant is made of an organic metal complex capable of phosphorescence from a triplet state and contains at least a metal ion belonging to the VII family of the Mendeleyev periodic table.
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L37 ANSWER 72 OF 73 JAPIO COPYRIGHT 2003 JPO
AN 2001-244073 JAPIO
TI ORGANIC FILM LUMINESCENT DISPLAY
IN TERAO YUTAKA; SHIRAISHI YOTARO
PA FUJI ELECTRIC CO LTD
PI JP 2001244073 A 20010907 Heisei
AI JP 2000-55488 (JP2000055488 Heisei) 20000301
PRAI JP 2000-55488 20000301
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
IC ICM **H05B033-10**
ICS B23K026-00; **H01L021-302; H05B033-12; H05B033-14; H05B033-22**
ICI B23K101:36
AB PROBLEM TO BE SOLVED: To provide an excellent organic film luminescent display easy to pattern the upper electrode in a desired shape without damaging the elements in laser beam machining and easy to manufacture with good productivity at a low cost.
SOLUTION: This display is provided with a substrate, a lower electrode formed on the substrate, an **organic electroluminescent** medium **layer** including at least a **light emitting** layer formed on the lower electrode, and an upper electrode formed on the **organic electroluminescent** medium **layer**, and uses the overlapped area of the lower electrode, the **organic electroluminescent** medium **layer** and the upper electrode as a **light emitting** element respectively. The upper electrode and the **organic electroluminescent** medium **layer** are patterned in a desired shape by laser beam machining. A vapor deposited layer having a melting point lower than the upper electrode is provided at least in the laser beam machined portion **between** the lower **electrode** and the **organic electroluminescent** medium **layer**.
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AN 2001-076882 JAPIO
TI ORGANIC **EL** ELEMENT, ITS MANUFACTURE AND ITS DISPLAY DEVICE
IN TANAKA HARUO; MORIMOTO MITSURU
PA ROHM CO LTD
PI JP 2001076882 A 20010323 Heisei
AI JP 1999-249954 (JP11249954 Heisei) 19990903
PRAI JP 1999-249954 19990903
SO PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2001
IC ICM **H05B033-26**

ICS G09G003-20; G09G003-30; **H01L031-12; H05B033-08; H05B033-14**

AB PROBLEM TO BE SOLVED: To provide an organic **EL** element improving in current efficiency while forming both electrodes with transparent electrodes without giving damage to an **organic layer** due to temperature and having too large charge implanting barriers **between** the **electrode** and the **organic layer**, and a display device superior in display property using the organic **EL** element with both transparent faces for monitoring its light to be fedback on one side.
SOLUTION: This organic **EL** element has a first light transmissive electrode 2 on a substrate 1 and an **organic layer** 7 with at least a luminescent layer 4 on the first electrode 2. A second light transmissive electrode 9 is provided on the **organic layer** 7 and at least the second electrode 9 is formed of indium oxide. A display device has a light feedback circuit provided on the side of the substrate 1 for driving the organic **EL** element 10 with a **light emitted** from the organic **EL** element 10.